NHDES-W-06-012

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

WETLANDS PERMIT APPLICATION

Land Resources Management
Wetlands Bureau
Check the status of your application: www.des.nh.gov/onestop

RSA/Rule: RSA 482-A/ Env-Wt 100-900

1. REVIEW TIME:
Indicate your Review Time below. Refer to Guidance Document A for instructions.

☒ Standard Review (Minimum, Minor or Major Impact) ☐ Expedited Review (Minimum Impact only)

2. PROJECT LOCATION:
Separate applications must be filed with each municipality that jurisdictional impacts will occur in.

ADDRESS: **130' NW of intersection of US 302 with Harts Location-Carroll Town Line**		TOWN/CITY: **Harts Loc. & Carroll**	
TAX MAP: **Carl 211, HartLoc A**	BLOCK:	LOT: **Carl 002, HartLoc 1A**	UNIT:
USGS TOPO MAP WATERBODY NAME: **Saco River** ☐ NA		STREAM WATERSHED SIZE: **829 Acres** ☐ NA	
LOCATION COORDINATES (If known): **N44-13, W71-24.5** ☒ Latitude/Longitude ☐ UTM ☐ State Plane			

3. PROJECT DESCRIPTION:
Provide a brief description of the project outlining the scope of work. Attach additional sheets as needed to provide a detailed explanation of your project. DO NOT reply "See Attached" in the space provided below.

Rehabilitation of an existing 950' long corrugated metal plate arch culvert (Bridge #055/091) carrying the headwaters of the Saco River. The culvert consists of 3 segments, (1) 137" wide x 87" high x 325' long, (2) 103" wide x 71' high x 322' long, (3) 103" wide x 71' high x 276' long. The lower two sections will be lined with a corrugated metal plate liner. The upper pipe segment will be lined with a sprayed on mortar lining, approximately 2" to 4" in thickness. Rock scaling by hand methods is also included.

4. SHORELINE FRONTAGE

☒ NA This lot has no shoreline frontage. SHORELINE FRONTAGE:

Shoreline frontage is calculated by determining the average of the distances of the actual natural navigable shoreline frontage and a straight line drawn between the property lines, both of which are measured at the normal high water line.

5. RELATED PERMITS, ENFORCEMENT, EMERGENCY AUTHORIZATION, SHORELAND, ALTERATION OF TERRAIN, ETC...

Shoreland PBN for construction activities related to the rehabilitation.

6. NATURAL HERITAGE BUREAU & DESIGNATED RIVERS:
See the Instructions & Required Attachments document for instructions to complete a & b below.

a. Natural Heritage Bureau File ID: NHB **17** - **0942** .

b. ☒ Designated River the project is in ¼ miles of: **the Saco River- LAC is inactive** ; and
date a copy of the application was sent to the Local River Management Advisory Committee: Month: __ Day: __ Year: ____
☒ NA

7. APPLICANT INFORMATION (Desired permit holder)

LAST NAME, FIRST NAME, M.I.: **Tobey Reynolds, PE**			
TRUST / COMPANY NAME: **NH DOT**	MAILING ADDRESS: **7 Hazen Drive / PO Box 483**		
TOWN/CITY: **Concord**		STATE: **NH**	ZIP CODE: **03302-0483**
EMAIL or FAX: **Bureau16@dot.nh.gov**	PHONE: **(603) 271-2171**		
ELECTRONIC COMMUNICATION: By initialing here: TR, I hereby authorize NHDES to communicate all matters relative to this application electronically			

8. PROPERTY OWNER INFORMATION (If different than applicant)

LAST NAME, FIRST NAME, M.I.:			
TRUST / COMPANY NAME:	MAILING ADDRESS:		
TOWN/CITY:		STATE:	ZIP CODE:
EMAIL or FAX:	PHONE:		
ELECTRONIC COMMUNICATION: By initialing here _____, I hereby authorize NHDES to communicate all matters relative to this application electronically			

9. AUTHORIZED AGENT INFORMATION

LAST NAME, FIRST NAME, M.I.:	COMPANY NAME:		
MAILING ADDRESS:			
TOWN/CITY:		STATE:	ZIP CODE:
EMAIL or FAX:	PHONE:		
ELECTRONIC COMMUNICATION: By initialing here _____, I hereby authorize NHDES to communicate all matters relative to this application electronically			

10. PROPERTY OWNER SIGNATURE:

See the Instructions & Required Attachments document for clarification of the below statements

By signing the application, I am certifying that:

1. I authorize the applicant and/or agent indicated on this form to act in my behalf in the processing of this application, and to furnish upon request, supplemental information in support of this permit application.
2. I have reviewed and submitted information & attachments outlined in the Instructions and Required Attachment document.
3. All abutters have been identified in accordance with RSA 482-A:3, I and Env-Wt 100-900.
4. I have read and provided the required information outlined in Env-Wt 302.04 for the applicable project type.
5. I have read and understand Env-Wt 302.03 and have chosen the least impacting alternative.
6. Any structure that I am proposing to repair/replace was either previously permitted by the Wetlands Bureau or would be considered grandfathered per Env-Wt 101.47.
7. I have submitted a Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) to the NH State Historic Preservation Officer (SHPO) at the NH Division of Historical Resources to identify the presence of historical/ archeological resources while coordinating with the lead federal agency for NHPA 106 compliance.
8. I authorize NHDES and the municipal conservation commission to inspect the site of the proposed project.
9. I have reviewed the information being submitted and that to the best of my knowledge the information is true and accurate.
10. I understand that the willful submission of falsified or misrepresented information to the New Hampshire Department of Environmental Services is a criminal act, which may result in legal action.
11. I am aware that the work I am proposing may require additional state, local or federal permits which I am responsible for obtaining.

Property Owner Signature	Print name legibly	Date
Tobey Reynolds	Tobey Reynolds	5/9/2017

MUNICIPAL SIGNATURES

11. CONSERVATION COMMISSION SIGNATURE

The signature below certifies that the municipal conservation commission has reviewed this application, and:

1. Waives its right to intervene per RSA 482-A:11;
2. Believes that the application and submitted plans accurately represent the proposed project; and
3. Has no objection to permitting the proposed work.

⇨	Print name legibly	Date

DIRECTIONS FOR CONSERVATION COMMISSION

1. Expedited review ONLY requires that the conservation commission's signature is obtained in the space above.
2. Expedited review requires the Conservation Commission signature be obtained **prior** to the submittal of the original application to the Town/City Clerk for signature.
3. The Conservation Commission may refuse to sign. If the Conservation Commission does not sign this statement for any reason, the application is not eligible for expedited review and the application will reviewed in the standard review time frame.

12. TOWN / CITY CLERK SIGNATURE

As required by Chapter 482-A:3 (amended 2014), I hereby certify that the applicant has filed four application forms, four detailed plans, and four USGS location maps with the town/city indicated below.

⇨ Town/City Clerk Signature	Print name legibly	Town/City	Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

1. For applications where "Expedited Review" is checked on page 1, if the Conservation Commission signature is not present, NHDES will accept the permit application, but it will NOT receive the expedited review time.
2. IMMEDIATELY sign the original application form and four copies in the signature space provided above;
3. Return the signed original application form and attachments to the applicant so that the applicant may submit the application form and attachments to NHDES by mail or hand delivery.
4. IMMEDIATELY distribute a copy of the application with one complete set of attachments to each of the following bodies: the municipal Conservation Commission, the local governing body (Board of Selectmen or Town/City Council), and the Planning Board; and
5. Retain one copy of the application form and one complete set of attachments and make them reasonably accessible for public review.

DIRECTIONS FOR APPLICANT:

1. Submit the single, original permit application form bearing the signature of the Town/ City Clerk, additional materials,

13. IMPACT AREA:

For each jurisdictional area that will be/has been impacted, provide square feet and, if applicable, linear feet of impact

Permanent: impacts that will remain after the project is complete.

Temporary: impacts not intended to remain (and will be restored to pre-construction conditions) after the project is complete.

JURISDICTIONAL AREA	PERMANENT Sq. Ft. / Lin. Ft.	TEMPORARY Sq. Ft. / Lin. Ft.
Forested wetland	☐ ATF	☐ ATF
Scrub-shrub wetland	☐ ATF	☐ ATF
Emergent wetland	☐ ATF	☐ ATF
Wet meadow	☐ ATF	☐ ATF
Intermittent stream	/ ☐ ATF	/ ☐ ATF
Perennial Stream / River	/ ☐ ATF	1150 / 96 ☐ ATF
Lake / Pond	/ ☐ ATF	/ ☐ ATF
Bank - Intermittent stream	/ ☐ ATF	/ ☐ ATF
Bank - Perennial stream / River	/ ☐ ATF	/ ☐ ATF
Bank - Lake / Pond	/ ☐ ATF	/ ☐ ATF
Tidal water	/ ☐ ATF	/ ☐ ATF
Salt marsh	☐ ATF	☐ ATF
Sand dune	☐ ATF	☐ ATF
Prime wetland	☐ ATF	☐ ATF
Prime wetland buffer	☐ ATF	☐ ATF
Undeveloped Tidal Buffer Zone (TBZ)	☐ ATF	☐ ATF
Previously-developed upland in TBZ	☐ ATF	☐ ATF
Docking - Lake / Pond	☐ ATF	☐ ATF
Docking - River	☐ ATF	☐ ATF
Docking - Tidal Water	☐ ATF	☐ ATF
TOTAL	/	1150 / 96

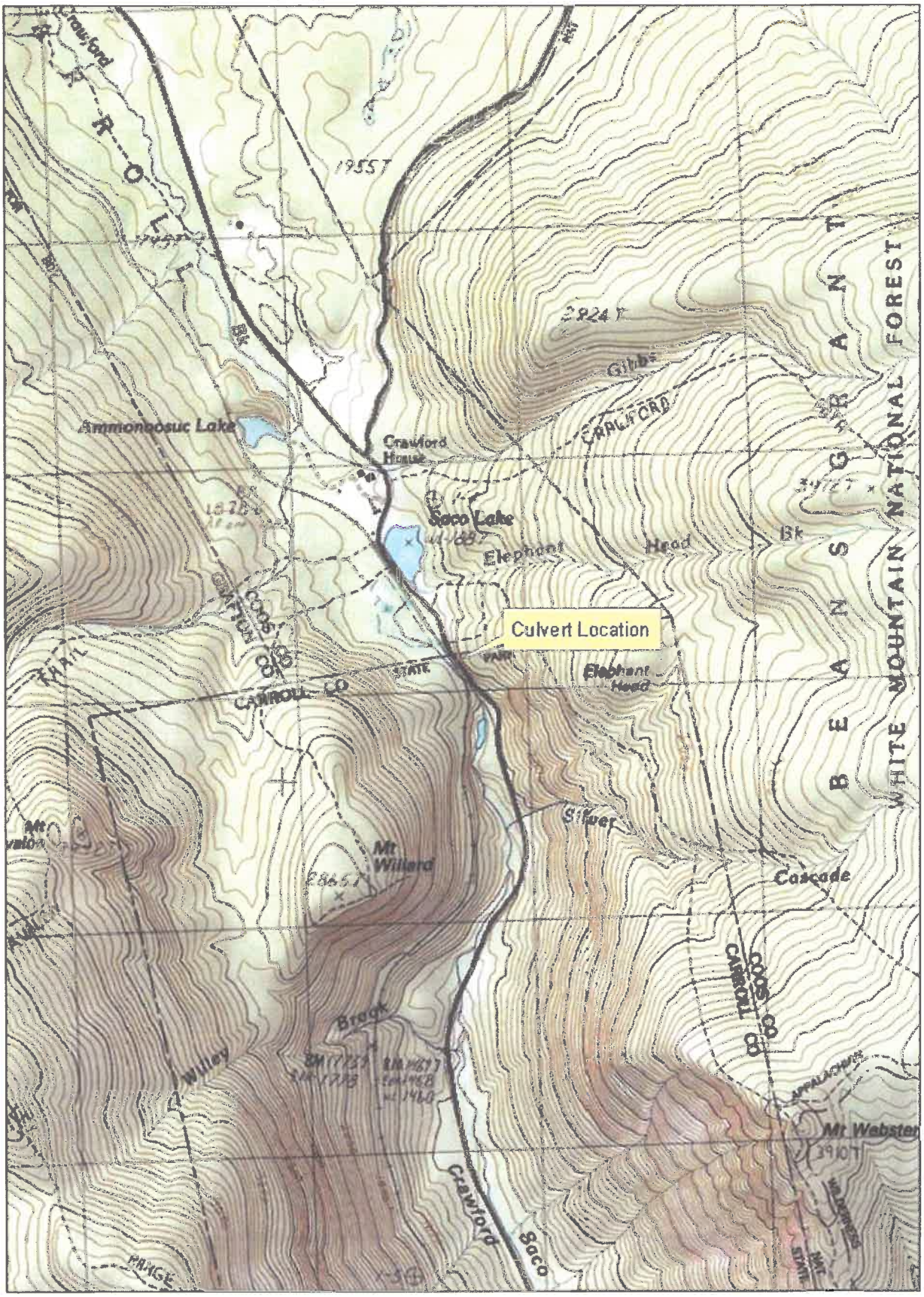
14. APPLICATION FEE: See the Instructions & Required Attachments document for further instruction

☐ Minimum Impact Fee: Flat fee of $ 200

☒ Minor or Major Impact Fee: Calculate using the below table below

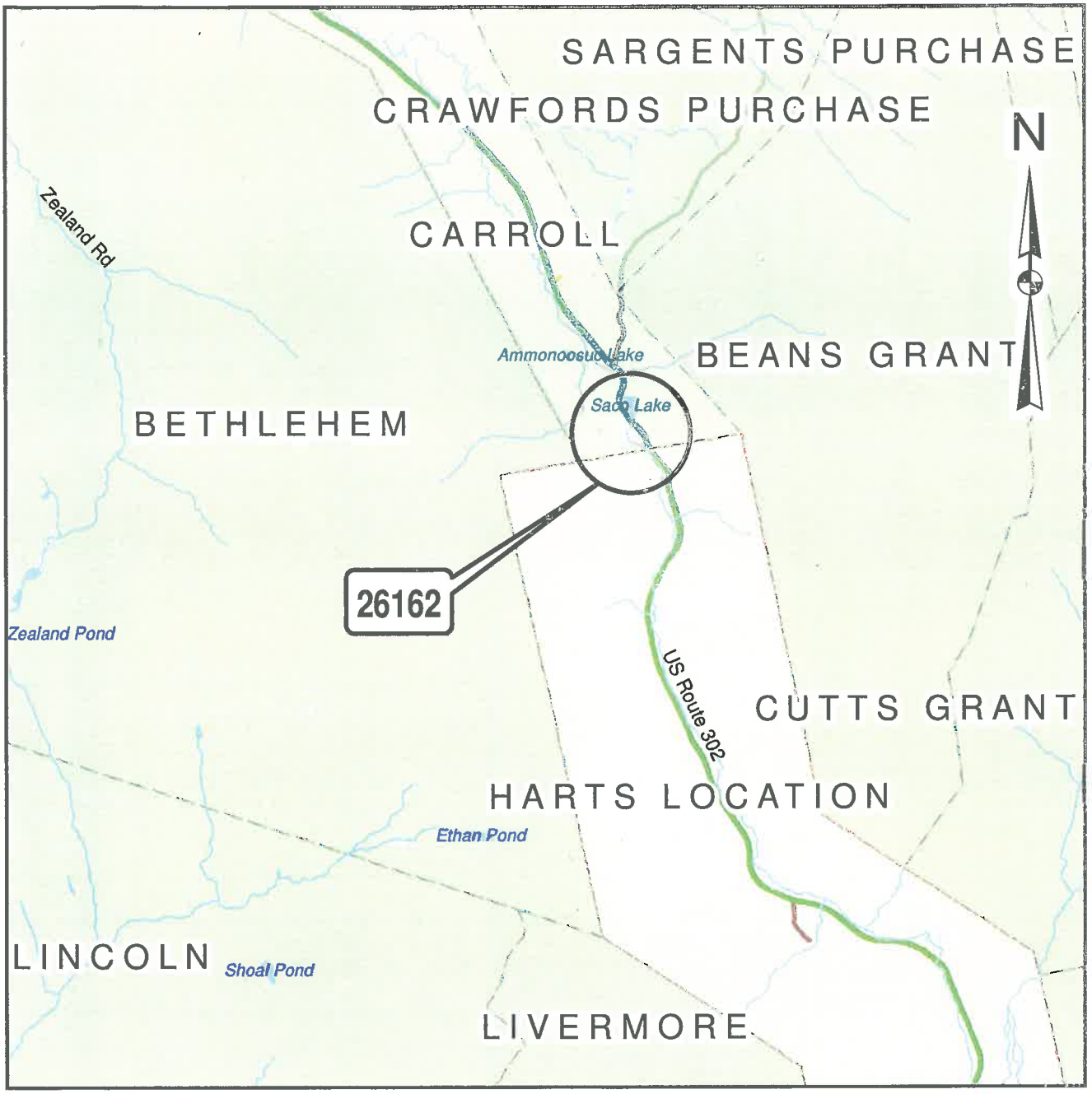
Permanent and Temporary (non-docking)	**1150** sq. ft.	X $0.20 =	$ **230.00**
Temporary (seasonal) docking structure:	sq. ft.	X $1.00 =	$
Permanent docking structure:	sq. ft.	X $2.00 =	$
Projects proposing shoreline structures (including docks) add $200 =			$
Total =			$
The Application Fee is the above calculated Total or $200, whichever is greater =			$

Harts Location-Carroll, X-A003(275), 26162



1 inch = 2,000 feet

HARTS LOCATION / CARROLL - U.S. ROUTE 302



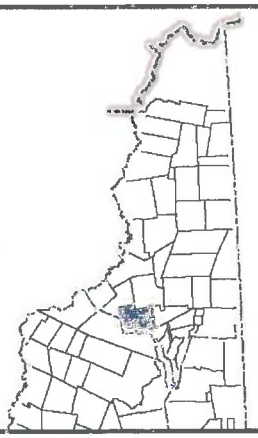
Miles
1 ½ 0 1 2

LEGEND

- Streams
- Water Bodies
- US Routes
- State Routes
- Interstates
- Local Roads
- Town Boundary

New Hampshire DOT
Department of Transportation

State #: 26162
Federal #: X-A003(275)
LOCATION MAP



NEW HAMPSHIRE DEPARTMENT OF Environmental Services

WETLANDS PERMIT APPLICATION – ATTACHMENT A
MINOR AND MAJOR - 20 QUESTIONS

Land Resources Management
Wetlands Bureau

Check the Status of your application: www.des.nh.gov/onestop

RSA/ Rule: RSA 482-A, Env-Wt 100-900

Env-Wt 302.04 Requirements for Application Evaluation - For any major or minor project, the applicant shall demonstrate by plan and example that the following factors have been considered in the project's design in assessing the impact of the proposed project to areas and environments under the department's jurisdiction. Respond with statements demonstrating:
1. The need for the proposed impact.
The existing corrugated metal plate arch culvert is deteriorating. This culvert runs under the southbound travel lane of US Route 302 for about 825', with less than 3 feet of cover. Temporary repairs were required in 2012, which resulted in the emergency closure of one lane of US Route 302 for about 2 weeks. The 2014 inspection report for the structure indicates that the culvert is heavily rusted and pitted on the invert and in small areas in the top of the culvert. The inspection report also commented that there were several areas in the pipe that were very thin near connection points. Continued deterioration of the culvert will likely result in the need for additional emergency repairs and delaying repairs now may require a more costly permanent solution in the future. When the emergency repairs were required, the pipe was accessed from above, requiring alternating one-way traffic. US Route 302 is used heavily by tourists during the summer months and an emergency repair during that time could create substantial delays for the traveling public.
2. That the alternative proposed by the applicant is the one with the least impact to wetlands or surface waters on site.
The preferred alternative includes rehabilitation with two different treatments. The lower two sections will be lined with a corrugated metal plate liner. The liner is constructed by assembling individual plates inside the existing culvert. Once complete, the space between the current pipe and the new pipe wil be filled with grout. The upper segment of the culvert controls capacity, so the proposed rehabilitation method for this segment is a relatively thin sprayed on mortar liner. A water diversion will be utilized to move water through or around the construction area. Rehabilitation by the methods proposed will address the need and purpose for the project, with the fewest impacts to the Saco River. If replacement of the structure were selected, the construction would result in significant temporary and permanent impacts to the Saco River and the banks of the River. Potential for rehabilitation by other methods was explored, but these methods would result in reduced capacity of the structure and/or increased outlet velocity, these options would have more impacts on the Saco River than the preferred alternative.

3. The type and classification of the wetlands involved.

The Saco River (R3UB1) will be impacted by the project as proposed. The Saco River is an Upper Perennial River with an unconsolidated, cobble-gravel bottom. The Saco River is characterized by a high gradient with no tidal influence.

4. The relationship of the proposed wetlands to be impacted relative to nearby wetlands and surface waters.

The Saco River is a Designated River in NH. The Saco River is classified as a "Natural River" through the project area. The northern edge of the proposed project area is located a short distance (less than 1,000 feet) south of the base of the dam at Saco Lake, where the Saco River begins. The Saco River flows through a large wetland system between the dam at Saco Lake and the inlet of the structure that is proposed for rehabilitation. The Saco River flows through Crawford Notch in the project location. The River becomes quite steep at the outlet of the structure and in the area south of the project the River is characterized by fast-moving water, tumbling over rocks and boulders with frequent cascades.

5. The rarity of the wetland, surface water, sand dunes, or tidal buffer zone area.

The Saco River is a NH Designated River and in the project areas has been classified as a "Natural River". There are nine river values and characteristics which may qualify a river for designation into the Designated Rivers Program. The Saco River supports many of these natural, managed, cultural, and recreational resource values and characteristics at a level of either statewide or local significance. The resource values which qualify the Saco River for designation are: geologic resources; wildlife, plant and fish resources; water quality; scenic values; historic and archaeological resources; community resources; and recreational resources.

6. The surface area of the wetlands that will be impacted.

The proposed rehabilitation will require 1,150 SF of temporary impact for installing a water diversion at the culvert inlet, concrete repairs inside the culvert inlet, and removal of sediment and debris from the energy dissipator at the outlet.

7. The impact on plants, fish and wildlife including, but not limited to:
   a. Rare, special concern species;
   b. State and federally listed threatened and endangered species;
   c. Species at the extremities of their ranges;
   d. Migratory fish and wildlife;
   e. Exemplary natural communities identified by the DRED-NHB; and
   f. Vernal pools.

The proposed rehabilitation will result in no significant change to existing culvert capacity, outlet velocity, or flood elevation.

a) A Natural Heritage Bureau review of the project area resulted in a determination that, although there was a NHB record present in the vicinity, the Natural Heritage Bureau does not expect that it will be impacted by the proposed project.

b) The Canada Lynx and the Northern Long-Eared Bat (NLEB) are listed on the Official Species List for the project area. The Canada Lynx is not likely to be found in such close proximity to a roadway and would not by impacted by the project as proposed. The project includes tree clearing during the NLEB active season for rock scaling on the opposite side of Route 302 from the structure. The project is therefore considered to be Likely to Adversely Affect the NLEB in accordance with the FHWA Range-wide Indiana Bat and Northern Long-Eared Bat Programmatic Consultation. The USFWS has issued a Biological Opinion that the activities in the FHWA Programmatic Consultation are not likely to jeopardize the continued existence of the either bat species. The USFWS Biological Opionion indicates that incidental take of the NLEB that may occur from the project is not prohibited.

c) There are no known species at the extremities of their ranges in the project area.

d) The Saco River is too steep in the area at the outlet of the structure to support fish passage. The project as proposed will incorporate BMPs to protect water quality, and so, will not impact migratory fish downstream of the project area. The project as proposed is not expected to imapct migratory wildlife. Saco Lake and Saco River are stocked with Brook Trout.

e) No examplary natural communities were identified in the project area by NHB.

f) No vernal pools were identified in the project area.

8. The impact of the proposed project on public commerce, navigation and recreation.

The project will have no permanent impact to public commerce, navigation, or recreation. There will be temporary impacts to the recreational use of the an existing informal gravel parking area at the culvert inlet for a duration of about 3 months. Alternating one-way traffic may be required on US Route 302 during certain phases of the project, particularly during rock scaling. Delays are anticipated to be of short duration and are not expected to impact public commerce or navigation.

9. The extent to which a project interferes with the aesthetic interests of the general public. For example, where an applicant proposes the construction of a retaining wall on the bank of a lake, the applicant shall be required to indicate the type of material to be used and the effect of the construction of the wall on the view of other users of the lake.

There will be no lasting impact to aesthetics, as all improvements are contained within the existing culvert. During construction the project area will be impacted by construction vehicles and activities. Once construction is complete, the Saco River and the culvert are expected to appear as they do today.

10. The extent to which a project interferes with or obstructs public rights of passage or access. For example, where the applicant proposes to construct a dock in a narrow channel, the applicant shall be required to document the extent to which the dock would block or interfere with the passage through this area.

There will be no permanent impact to public passage or access. Temporary impacts to traffic during construction will consist of short duration lane closures which may result in minor delays. At least one lane of traffic will be maintained at all times.

11. The impact upon abutting owners pursuant to RSA 482-A:11, II. For example, if an applicant is proposing to rip-rap a stream, the applicant shall be required to document the effect of such work on upstream and downstream abutting properties.

There will be no impact to abutters. The rehabilitation of the culvert is not expected to create any significant changes above or below the structure on the Saco River. Water will pass through the structure in much the same way as it does currently.

12. The benefit of a project to the health, safety, and well being of the general public.

Rehabilitation of this culvert will prevent future emergency repairs and associated road closures. Failure of this culvert and resulting closure of US Route 302 would cause significant hardship to the general pubic, commerce, and tourism as it is one of the only east-west routes in the area. There are no local roads that could serve as alternate routes. Best Management Practices will be adopted during construction to ensure that the water quality of the Saco River is protected.

13. The impact of a proposed project on quantity or quality of surface and groundwater. For example, where an applicant proposes to fill wetlands the applicant shall be required to document the impact of the proposed fill on the amount of drainage entering the site versus the amount of drainage exiting the site and the difference in the quality of water entering and exiting the site.

The project will have no impact on the quantity or quality of surface water or groundwater. The hybrid proposed rehabilitation design was selected to ensure that the structure did not significantly change the water flow through the project area. Following construction the structure and the Saco River are expected to flow in the same way that they do currently. BMPs will be incorporated to protect the quality of surface and groundwater. If the structure were not rehabilitated, future failures are anticipated, which would most likely have negative impacts on water quality.

14. The potential of a proposed project to cause or increase flooding, erosion, or sedimentation.

The proposed rehabilitation method will not cause any significant change to the culvert capacity, outlet velocity, flood levels, erosion, or sedimentation. Best management practices will be adopted to protect water quality and prevent erosion during construction of the project. Therefore, the project as proposed will not cause any flooding, erosion, or sedimentation. Also, if the structure is not rehabilitated, future failures of the structure could lead to negative impacts to the Saco River and potential flooding. If the structure were to fail, US Route 302 could need to be closed for emergency repairs.

15. The extent to which a project that is located in surface waters reflects or redirects current or wave energy which might cause damage or hazards.

The project as proposed will perpetuate the existing conditions in the project area. Therefore, the project will not reflect or redirect currents or wave energy.

16. The cumulative impact that would result if all parties owning or abutting a portion of the affected wetland or wetland complex were also permitted alterations to the wetland proportional to the extent of their property rights. For example, an applicant who owns only a portion of a wetland shall document the applicant's percentage of ownership of that wetland and the percentage of that ownership that would be impacted.

There are no permanent impacts to wetlands proposed by the project as designed. The structure is unique, and so, it is unlikely that any abutting property owners would propose similar temporary impacts to the Saco River. The project as proposed will not impact abutting property owners or change conditions of the Saco River in Crawford Notch. Further, if the structure is not rehabilitated, future failures of the structure could lead to flooding in the area and closures of US Route 302.

17. The impact of the proposed project on the values and functions of the total wetland or wetland complex.

The proposed project design will perpetuate existing conditions in the project area. Once constructed, the structure will accommodate the flow of the Saco River and the velocity and capacity of water in the structure are not anticipated to tbe altered by the proposed rehabilitation. Best Management Practices will be incorporated during construction to protect water quality. The conditions in the wetland south of the dam on Saco Lake and north of the culvert inlet are not anticipated to change as a result of the proposed project.

18. The impact upon the value of the sites included in the latest published edition of the National Register of Natural Landmarks, or sites eligible for such publication.

There are no sites included in the National Register of Natural Landmarks in the project area. The nearest Natural Landmark is Nancy Brook Old-Growth Forest, which is located south of Crawford Notch State Park and will not be impacted by the project as proposed.

19. The impact upon the value of areas named in acts of Congress or presidential proclamations as national rivers, national wilderness areas, national lakeshores, and such areas as may be established under federal, state, or municipal laws for similar and related purposes such as estuarine and marine sanctuaries.

The inlet of the structure is located in the White Mountain National Forest in Carroll and the outlet is located in Crawford Notch State Park in Hart's Location. The structure carries the Saco River and passes under US Route 302. US Route 302 through Crawford Notch is part of the White Mountain Trail, a National Scenic Byway. Though there will be some impacts to these resources during construction, the rehabilitation of the structure will not have lasting impacts on these resources. Further, if the structure is not rehabilitated, future failures leading to negative impacts to the Saco River and closures of US Route 302 are anticipated.

20. The degree to which a project redirects water from one watershed to another.

The project does not redirect water from one watershed to another.

Additional comments

BUREAU OF ENVIRONMENT
CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting
DATE OF CONFERENCE: March 15th, 2017
LOCATION OF CONFERENCE: John O. Morton Building
ATTENDED BY:

NHDOT
Matt Urban
Sarah Large
Ron Crickard
Mark Hemmerlein
Kerry Ryan
Marc Laurin
Rebecca Martin
Jon Evans
Bill Rollins
Steve Johnson
Ralph Sanders
Chris Carucci
Tim Mallette
Joseph Adams
Michael Licciardi
Rita Hunt
Brian Lombard

ACOE
Mike Hicks

NHDES
Gino Infascelli
Lori Sommer

NHF&G
John Magee

NH Natural Heritage Bureau
Amy Lamb
Bob Spoerl

Consultants/Public Participants
Peter Walker
Frank Koczalka
Marty Kennedy
Jennifer Riordan
Nicholas Sceggell
Robert Durfee
Jim Bouchard
Dawn Tuomala
Richard Yarnold
Christian Rainey
Jack Wozmak

(When viewing these minutes online, click on an attendee to send an e-mail)

PRESENTATIONS/ PROJECTS REVIEWED THIS MONTH:
(minutes on subsequent pages)

(When viewing these minutes online, click on a project to zoom to the minutes for that project)

if so, those impacts would be considered temporary. If the areas are not already stone, then the additional stone impacts are permanent and would require mitigation. G. Infascelli asked if there were any benches that would be incorporated into the new crossing. A 9' bench and an 8.5' bench are included in the design.

This project was previously discussed at a Monthly Natural Resource Agency Coordination Meeting on 8/21/13.

Harts Location- Carroll, #26162 (X-A003(275))

Chris Carucci provided an overview of the project. This is a culvert repair project funded under the Federal Culvert Repair Program. The culvert is a Tier 3 Stream Crossing, classified as a Bridge, and carries the headwaters of the Saco River under US Route 302. The culvert a multi-section culvert and the inlet is in the Town of Carroll, partly within the White Mountain National Forest and partly within the Conway Scenic Railroad right-of-way. The lower portion of the culvert is within the Town of Harts Location, partly with the highway right-of-way, railroad right-of-way, and Crawford Notch State Park. The Town Line is also the Carroll County/Coos County line.

The culvert is a corrugated metal plate arch originally constructed in 1958 and modified in 1961. The culvert length is approximately 950', with the alignment primarily under US Route 302 adjacent to the Conway Scenic Railroad. The culvert has less than 3' of cover for most of its length. The inlet is a complex concrete structure including retaining walls, a 5' x 16' opening and a transition section. C. Carucci commented that the people who constructed the inlet in 1961 did a nice job with the design and construction of this custom inlet. There is a concrete pad at the inlet. Above the inlet, there is a large marsh/wetland that is approximately 15 acres in size. The upper pipe segment is 137" wide x 87" high, 325' long, at 0.4% slope. The middle pipe segment is 103" wide x 71" high, 322' long at 3.9% slope. A smooth tapered concrete transition connects these segments. The lower pipe segment is 103" wide x 71" high, 276' long at 10% slope. A concrete energy dissipator is connected to the pipe outlet, which then flows to a very steep channel composed of ledge outcrops and boulders. At the outlet of the pipe, water drops around 8 feet to the floor of the energy dissipator. There is a timber top covering the dissipator. Photos of the inlet, outlet, and Route 302 were shown to the group.

Bridge inspectors detected corrosion in the top of the pipe in 2012. The Bureau of Bridge Maintenance patched two locations in the summer of 2012, and recommended that a permanent repair project be initiated. C. Carucci explained that the drainage area is about 867 acres and the existing culvert has sufficient capacity to pass a 100 year storm.

Numerous options have been considered, including replacement with a structure recommended by the NH Stream Crossing Guidelines, replacement in kind, several sprayed-on lining materials, a corrugated metal liner, or a hybrid of the sprayed on lining and metal liner. Replacement in kind and replacement with a structure that is compliant with the stream crossing rules would require closing the road for several months. DRED has provided economic impact estimates in the millions of dollars in lost revenue from such a closure. Railroad operations would also be impacted, with costs of $100,000 or more, depending on the duration.

The preferred option is a hybrid rehabilitation treatment. The lower two sections will be lined with a corrugated metal plate liner, one size smaller than the existing size. The liner is constructed by assembling individual plates inside the existing culvert. Once complete, the space between the current pipe and the new pipe is filled with grout. Based on hydraulic analysis, the reduction in diameter will not affect capacity, and will maintain the existing outlet velocity.

The upper segment controls capacity, so the proposed rehabilitation method for this segment is a relatively thin sprayed on mortar liner. This treatment involves spraying several coatings of mortar from inside the pipe, with a reinforcing mesh between layers. Mike Hicks inquired if the existing pipe would continue to rust and if the design would depend on strength from the existing rusting pipe. C. Carucci explained that the sprayed on thickness is designed to be a fully structural repair, assuming no support from the existing pipe. A design thickness from one manufacturer of 1.6" was suggested to be sufficient. The minimum thickness will be 2". This this will result in a slight reduction in diameter but a smoother interior surface. Analysis indicates a maximum 6" increase in headwater, depending on the smoothness of the final surface. Matt Urban asked if this would be the first time utilizing this treatment in NH. C. Carucci explained that it would, the mortar is a geopolymer with aluminum and silica as its base. The treatment has been well reviewed in other states. He explained that it dries faster than Portland cement and adheres to itself. Bob Spoerl asked if the pipe fills during flooding events, C. Carucci explained that it does not. B. Spoerl also commented on potential options for linear grooves within the pipe to control the direction of water through the pipe. C. Carucci explained that the spray-on methodology does not seem to allow for this type of handling.

The construction methodology proposed is to install a temporary cofferdam at the inlet on top of the existing concrete pad. There is significant storage in the wetland on the opposite side of the railroad bridge and in the existing channel. This might be sufficient storage during dry conditions. The plan is to provide a pump to bypass the flow, if necessary. The discharge from the pump could be directed through the existing culvert or overland. In either case, the discharge would be into the energy dissipator.

C. Carucci commented that the group was hoping for guidance about which areas are jurisdictional and required permitting. Rebecca Martin commented that they do propose to remove some sediment form the structure. All debris from pipe cleaning will be captured inside the energy dissipator. Equipment will not be allowed off the road, except for lifting equipment at the inlet and outlet. At the inlet, the project proposes to replace broken concrete pieces that were cast in place. At the outlet the timbers over the energy dissipater will be replaced and the stone wall will be repaired. The proposed staging area is the existing gravel parking area just north of the inlet. R. Martin commented that the Saco River is designated as 'Natural' through this structure.

Gino Infascelli commented that there cannot be any new impacts. Although the project cannot have any new (permanent) impacts it sounded as though all of the impacts are temporary. He commented that if the impacts are not beyond the existing structure and pad, it should be in accordance with the River Advisory Board rules. The proposed culvert rehabilitation would be an alternative design.

C. Carucci estimated that the temporary impact area at inlet for a sandbag water diversion (placed on concrete pad) would be around 600 square feet. Mike Hicks indicated that the coffer dam on the concrete pad would be classified as fill, and would require permitting. An alternative design form will be required and it should document the change in capacity of the structure. Matt Urban commented that a permit will be required for the stream that flows through the pipe as this rehabilitation will have temporary impacts.

M. Hicks inquired about the type of review for Northern Long-Eared Bat. R. Martin explained that the USFWS Regional Field Office has indicated that an inspection of the inlet and outlet for indications of bat utilization would be sufficient (not the entire structure) for the project to be reviewed within the FHWA Programmatic Consultation. M. Hicks said this is fine.

This project has been previously discussed at the 7/16/2014 Monthly Natural Resource Agency Coordination Meeting.

Merrimack, #40300 (X-A0004(357))

J. Bouchard, Quantum Construction Consultants, LLC (QCC) provided an overview of the project noting that this is a NHDOT TAP project based on the Town of Merrimack's (Town) need and desire for a multi-use path that provides connectivity of existing residential area trails to Watson Park, a Town park, local businesses in the central business district, schools and Town offices.

Existing trails located to the west of the F.E. Everett Turnpike (FEET) would be connected to the new multi-use path at the existing pedestrian bridge located below the FEET. The existing trail system along the Souhegan River bank is about 5 feet wide and not ADA accessible. The new path would maintain the existing horizontal alignment, be widened to 8- foot width, and be surfaced with stone dust. Presently, there are small wooden pedestrian bridge crossings over drainage courses along the path that are not ADA compliant. These crossings would be revised for ADA compliance and cross culverts installed at the drainage crossings.

Further down the existing Souhegan River trail, there are other small paths that lead to the adjacent schools, to riverbank paths for river viewing, and to benches overlooking the river. These are used by many people including fisherman and the boyscouts. These paths would not be rebuilt as part of the project but accesses to them would be improved to match the proposed multi-use path. A sign at the end of the existing trail, at a former dam impoundment area, states that the trail will be continued from this point in the future. Multiple alternatives are being considered for crossing the former impoundment and drainage course within the impoundment area, utilizing comments received from two local concerns meetings. The former impoundment area crossing will be made by utilizing a board walk and a culvert. Preliminary StreamStats calculations indicate a 48-inch culvert with mortar rubble headwalls would be sufficient for the drainage crossing.

The preferred alternative from the Town and from public comments are for continuing the multi-use path to Watson Park by accessing the former dam sluiceway and masonry arch under US Rte. 3 then continuing to connect into the existing sidewalks at Watson Park and the sidewalk on the US Route 3 bridge. The path would pass through the existing headgate structure of the former Merrimack Village Dam. Currently, three options on this alternative are being evaluated for the final routing the path on the east of US Rte. 3. Each one of the alternatives will impact the existing

BUREAU OF ENVIRONMENT
CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting
DATE OF CONFERENCE: July 16, 2014
LOCATION OF CONFERENCE: John O. Morton Building
ATTENDED BY:

NHDOT
Christine Perron
Ron Crickard
Jim Kirouac
Chris Carucci
Doug Holmes
Joe Adams

Federal Highway Administration
Jamie Sikora

Army Corps of Engineers
Michael Hicks

EPA
Mark Kern

NHDES
Gino Infascelli
Lori Sommer

NH Fish & Game
Carol Henderson

Normandeau Associates
Ian Broadwater
Jameson Paine

FST, Inc
Deb Duhamel
John Stockton
Dave McNamara

GM2, Inc
Richard Geikie
Tom Levins

*(When viewing these minutes online, click on an attendee to send an **e**-mail)*

PRESENTATIONS/ PROJECTS REVIEWED THIS MONTH:
(minutes on subsequent pages)

(When viewing these minutes online, click on a project to zoom to the minutes for that project)

NOTES ON CONFERENCE:

Finalization of June Meeting Minutes

The June 18, 2014 meeting minutes were finalized.

Harts Location-Carroll, X-A003(275), 26162

Chris Carucci provided an overview of the project. This is a culvert repair project funded under the Federal Culver Repair Program. The culvert is a Tier 3 Stream Crossing, classified as a Bridge, and carries the headwaters of the Saco River under US Route 302. The culvert inlet is in the Town of Carroll, partly within the White Mountain National Forest and partly within the Conway Scenic Railroad right-of-way. The lower portion of the culvert is within the Town of Harts Location, partly within the highway right-of-way, railroad right-of-way, and Crawford Notch State Park. The Town Line is also the Carroll County/Coos County line.

The culvert is a corrugated metal plate arch originally constructed in 1958 and modified in 1961. The culvert length is approximately 950', with the alignment primarily under US Route 302. The culvert has less than 3' of cover for most of its length. The inlet is a complex concrete structure including retaining walls, a 5' x 16' opening and a transition section. The upper pipe segment is 137" wide x 87" high , 325' long, at 0.4% slope. The middle pipe segment is 103" wide x 71" high, 322' long at 3.9% slope. A smooth tapered concrete transition connects these segments. The lower pipe segment is 103" wide x 71" high, 276' long at 10% slope. A concrete energy dissipator is connected to the pipe outlet, which then flows to a very steep channel composed of ledge outcrops and boulders. Bridge inspectors detected corrosion in the top of the pipe in 2012. The Bureau of Bridge Maintenance patched two locations in the summer of 2012, and recommended that a permanent repair project be initiated.

The drainage area is about 867 acres, and is expected to generate 450 cfs in a 50 year storm and 700 cfs in a 100 year storm. There is significant storage in the lower watershed, including Saco Lake (approximately 7 acres), which has a dam, and a large wetland area (approximately 9 acres) on the west side of US Route 302. After accounting for storage effects, the flow through the culvert is 330 cfs for the Q50 and 430 cfs for the Q100. The existing culvert capacity is 470 cfs at maximum allowable headwater, which is set at 1' below the railroad bed. The existing culvert outlet velocity is around 20 ft/s at Q100. The existing energy dissipator was not modelled because it does not fit any of the standard types. It was evaluated for structural capacity, which indicated that it can withstand up to 40 ft/ sec outlet velocity. There is very little baseflow during dry periods (4" – 6" deep in the upper pipe), and little to no sediment transport, due to the large wetland just upstream.

Numerous options have been considered, including replacement with a structure recommended by the NH Stream Crossing Guidelines, replacement in-kind, several sprayed-on lining materials, and a corrugated metal liner. Two options are being developed further – a cement mortar lining, sprayed onto the interior of the culvert at a thickness of about 3", and a corrugated metal liner, which is constructed inside the pipe one plate at a time and then the annular space is filled with grout.

The cement lining increases capacity and velocity due to the smoother interior surface. Q100 velocity would be just under the 40 ft/sec allowable velocity. The metal liner would be one size smaller, and based on preliminary hydraulic analysis, would reduce capacity by about 15%. To restore the lost capacity, a thin cement lining could be sprayed inside the new metal liner on the first two segments of pipe. The lower pipe has significantly more capacity due to its steeper slope. The lower pipe would remain corrugated and would produce about the same outlet velocity as the existing.

The metal liner with grouted space appears to be the most durable option, and is also currently the least cost. The Department is still investigating the cost of the additional sprayed on interior coating. The mortar lining is relatively new, and only one NHDOT project has used it, with good results. It has been used in other States, and all available information indicates that it is a durable and cost effective lining method. Both of these options would require only minimal temporary wetland impacts for installation of a water diversion. Both options would allow larger storm events to pass through the culvert. Work operations would have to stop whenever a significant rainfall is forecast. A temporary diversion would convey a 2 year storm (about 2 ¾" of rain in 24 hours). The diversion would be accomplished with a 15" plastic pipe and cofferdam, preferably with the diversion pipe placed through the existing culvert, but pumping around the existing culvert may also be an option. A 15" diversion pipe would impound about 5' of water (about 8 ac-ft).

Christine Perron noted that she has coordinated with Jacquie Colburn at DES, who visited the site with Shane Csiski. Given the length and slope of the structure, they did not have any concerns with lining the existing structure, but did have some questions about construction methods that will be answered as soon as an alternative is chosen.

Carol Henderson asked if diverting the stream was necessary. C. Carucci responded that any alternative would require stream diversion. Work would be stopped during storms. He anticipated the construction period to be relatively short.

Jamie Sikora asked if any easements would be required on the State or Federal land. C. Carucci commented that coordination with DRED and the US Forest Service still needed to occur to determine if any easements or agreements would be necessary. J. Sikora indicated that he did not expect any concerns regarding Section 4(f) impacts if easements are required.

Gino Infascelli noted that, as a Natural segment of a Designated River, the appropriate rules would need to be addressed, which he thought allowed only temporary impacts to the river. C. Perron replied that she would ensure that the project complies with the rules. She noted again that the DES Rivers Program did not have concerns with lining the pipe, and added that the Local Advisory Committee is currently inactive.

C. Carucci noted that the project is currently scheduled to advertise in January 2015, with construction taking place during low flows in Summer 2015.

This project has not been previously discussed at a Monthly Natural Resource Agency Coordination Meeting.

Bedford, X-A001(160), 16156

David McNamara of FST presented an overview of the project. The existing Bowman Brook Culvert is on the NHDOT's red list, and was recently downgraded to critical. The culvert is a 90" corrugated metal pipe that runs under NH Route 114 as well as the Old Bedford Road bridge, which crosses over NH Route 114. Two alternatives were presented, a relocated 23' wide three sided box culvert, sized to meet current stream crossing guidelines, as well as a sliplining option. This option would also shorten the existing culvert to approximately 100 feet in length. Grading and new retaining walls would be necessary to shorten the culvert. This option would slightly increase flood elevations upstream; however, an overflow pipe could be added to maintain these elevations.

Carol Henderson asked if, instead of sliplining, a new, larger box culvert could be placed in the same location as the existing pipe. D. McNamara explained that had been considered, however it was felt that

there was too much risk. The existing pipe is set into ledge now, and a new culvert would require additional ledge removal. The ledge would be removed below the footings for the Old Bedford Road bridge piers, and within 2' of them horizontally. In addition, all the work would need to take place under the Old Bedford Road Bridge, which has 16' of clearance. There would be risk to the structural integrity of the existing bridge, as well as to cost and traffic impacts. The angle of the culvert wouldn't allow traffic to be maintained. It would need to be detoured, and due to the construction constraints, it would be very difficult to predict a detour length. The detour would be over local roads and through residential neighborhoods. It is not considered something that would be feasible for an extended period.

C. Henderson asked about the longevity of sliplining. D. McNamara stated they have a life span of approximately 75 years.

Lori Summer asked about upstream conditions. D. McNamara responded that there are 3 similarly sized culverts within about a mile upstream, including one other under NH Route 114.

L. Summer asked how an increase in the floodplain would be handled. D. McNamara said an overflow pipe would be proposed. Based on preliminary sizing, the pipe is expected to be in the range of 36" diameter.

Mike Hicks asked how much smaller the culvert would be after sliplining, and if the culvert would need to be sliplined again in 50 years or so. D. McNamara replied that sliplining would reduce the pipe size by approximately 10%. John Stockton from FST noted that would be within the expected life span of the bridge over NH Route 114. The culvert would likely be addressed with a reconstruction of the bridge, when the culvert and bridge could be designed and built together.

Mark Kern asked about costs. Conceptual estimates have the sliplining option at just over $1 million while the new 23' wide culvert relocation would be in the $3 to 4 million dollar range.

Gino Infascelli asked to see photos. Photos of the upstream culverts were provided and Ian Broadwater from Normandeau provided a description of the wetland types within the project area.

C. Henderson asked if there were potential concerns with woody debris blocking a sliplined culvert. I. Broadwater agreed with this concern and that the culvert should be larger. The corrugations within the existing culvert are filled with cobbles, indicating interruption in sediment transport. There is also a 3-4" perch at the culvert outlet. C. Henderson recommended that the perch be addressed in a sliplining option. It was agreed that this could be addressed.

L. Sommer asked if there was any opportunity for floodplain restoration. I. Broadwater felt there may be some opportunity upstream, but there does not appear to be much flood damage within the area.

D. McNamara discussed the schedule. The project is a priority, and the intent is to move right into the development of a NEPA document. There are also Right of Way questions being worked out that may impact the alternative selection.

Mark Kern asked C. Henderson if the area was important for fisheries. She didn't know. M. Kern noted that the larger culvert was a better option in general for natural resources, but it may not be a practical choice, particularly if there are several other problems in the vicinity. He wasn't sure that the larger culvert would be worth the cost. G. Infascelli noted that the upstream culverts are known problems in the vicinity of the project.

26162 HARTS LOCATION-CARROLL

1000 0 1000 2000

SCALE IN FEET

26162 Hart's Location Carroll: StreamStats Report

Region ID: NH
Workspace ID: NH20170426105335310000
Clicked Point (Latitude, Longitude): 44.21366, -71.40787
Time: 2017-04-26 12:56:43 -0400

Watershed at the structure inlet.

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	1.26	square miles
APRAVPRE	Mean April Precipitation	5.225	inches
WETLAND	Percentage of Wetlands	0.2536	percent
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	1010	feet per mi

Peak-Flow Statistics Parameters [100 Percent (1.26 square miles) Peak Flow Statewide SIR2008 5206]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.26	square miles	0.7	1290
APRAVPRE	Mean April Precipitation	5.225	inches	2.79	6.23
CSL10_85	Stream Slope 10 and 85 Method	1010	feet per mi	5.43	543
WETLAND	Percent Wetlands	0.2536	percent	0	21.8

Peak-Flow Statistics Disclaimers [100 Percent (1.26 square miles) Peak Flow Statewide SIR2008 5206]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Peak-Flow Statistics Flow Report [100 Percent (1.26 square miles) Peak Flow Statewide SIR2008 5206]

Statistic	Value	Unit
2 Year Peak Flood	158	ft^3/s
5 Year Peak Flood	297	ft^3/s
10 Year Peak Flood	419	ft^3/s
25 Year Peak Flood	586	ft^3/s
50 Year Peak Flood	725	ft^3/s

NH Department of Transportation
Bureau of Highway Design
Project, #26162
Env-Wt 904.09 Alternative Design
TECHNICAL REPORT

Env-Wt 904.09(a) - If the applicant believes that installing the structure specified in the applicable rule is not practicable, the applicant may propose an alternative design in accordance with this section.

Please explain why the structure specified in the applicable rule is not practicable (Env-Wt 101.69 defines practicable as *available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes.)*

The existing culvert has performed well since its construction in 1961. There have been no reports of flooding, overtopping the road, or damage due to lack of capacity or outlet velocity.

Replacing the entire culvert with a compliant structure (19' span) is estimated to cost at least $5 million, and would require an entire construction season to complete. Due to the depth of excavation and limited width between the rock slope and railroad, this option would involve closing US 302 for several months during the summer, potentially resulting in millions of dollars in lost revenue (according to an analysis performed by the NH Department of Resources and Economic Development), and would require suspension of railroad operations for about 2 months. This option would also require replacement of the concrete inlet and energy dissipator, which are potentially historic, and would likely have greater impacts to streams and wetlands.

Replacing only the corrugated metal pipes in-kind was also considered. The cost for this option is estimated at $3 million. Duration of closure of US 302 would be reduced to 3-4 months, and impact to railroad operations to about 1 month.

Rehabilitation of the existing culvert can be accomplished without excavation and without significant impacts to traffic or other resources at a cost of approximately $1.2 million. The work would take approximately 3 months during the summer and would have only minor impacts to roadway and rail traffic.

The following analysis will show that rehabilitation will not significantly affect the culvert capacity, or the potential for flooding, erosion or sedimentation.

The 100 year storm runoff passing through the existing culvert is predicted to be between 380 to 430 cfs after accounting for the effects of storage in Saco Lake and the large wetland immediately upstream of the culvert inlet. The design value selected for Q100 is 415 cfs, corresponding to 7.15 inches of rain in 24 hours.

The existing culvert capacity is approximately 470 cfs at the maximum headwater elevation of 1883.5. This elevation is 8.7' above the culvert inlet and corresponds to the elevation at which bypass flow would begin to occur. This flow corresponds to a rainfall of 7.95 inches in 24 hours. The existing outlet discharges into a concrete energy dissipator at a velocity of approximately 20 ft / second. It is estimated the dissipator can withstand velocities up to 40 ft / second. The velocity exiting the dissipator has not

been estimated due to the unique design. A photo of the culvert inlet with critical elevations shown is attached.

Analysis indicates that the culvert capacity is controlled by the barrel of the upper pipe segment. Barrel diameter, slope, and roughness are the primary factors controlling capacity. The proposed mortar lining of the upper pipe segment will reduce the barrel diameter, but will partially or mostly fill in the existing corrugations resulting in a smoother barrel. The thickness of the mortar lining will be as determined by the manufacturer to meet the structural load requirements. The thickness is anticipated to be 2" to 4". A thicker mortar lining will result in a smoother barrel. If the manufacturer cannot meet the structural requirements at 4" or less thickness, a corrugated metal plate liner can be installed and the corrugations can be filled with non-structural mortar resulting in a smooth barrel. Depending on the actual thickness of the lining and hydraulic resistance of the final barrel surface, the change in capacity will vary from a slight improvement to a slight reduction.

Lining the middle and lower pipe segments with corrugated metal plate liners will not affect capacity. In the existing and proposed conditions, the middle and lower pipe segments have significantly more capacity than the upper segment, due to their steeper slope. The smaller size and slightly smaller corrugations of the plate liners will result in a small increase in the lower pipe discharge velocity, but no significant difference in the velocity leaving the energy dissipator is anticipated.

The following analysis results are from HydroCADD, using culvert rating tables for the upper pipe segment developed in FHWA's HY-8 Culvert Analysis Program. A separate analysis of the existing and proposed conditions using ACOE's HEC-RAS River Analysis Program yielded similar results.

Scenario	Q100 through Culvert (cfs)	Headwater Elevation (ft)	Upper Pipe Barrel roughness (n)	Lower Pipe Outlet Velocity (ft/s)
Existing	412	1882.38	0.034	19.8
2" Mortar Liner	402	1882.49	0.029	20.8
4" Mortar Liner	420	1882.36	0.020	21.0
Plate Liner with mortar fill	416	1882.36	0.020	20.9

For reference, the typical roughness value (n) for concrete pipe is 0.012, 0.024 for average size corrugated metal pipes, and 0.034 for large structural plate arch pipes.

The proposed alternative meets the specific design criteria for Tier 2 and Tier 3 crossings to the *maximum extent practicable*, as specified below.

Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings – New Tier 2 stream crossings, replacement Tier 2 crossings that do not meet the requirements of Env-Wt 904.07, and new and replacement Tier 3 crossings shall be designed and constructed:

(a) In accordance with the NH Stream Crossing Guidelines.

It is not practicable to design and construct alternatives other than rehabilitation. No-Build would not address the ongoing culvert deterioration. Since the existing capacity is adequate, the additional costs and impacts associated with significant modifications or replacement cannot be justified.

(b) With bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing.

It is not practicable to alter water depths or velocities within the existing culvert without adversely affecting hydraulic capacity.
(c) To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage.

It is not practicable to provide vegetated banks within the existing culvert without adversely affecting hydraulic capacity.

(d) To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain.

It is not practicable to alter the existing culvert alignment or grade as part of the proposed rehabilitation treatment.

(e) To accommodate the 100-year frequency flood, to ensure that (1) there is no increase in flood stages on abutting properties; and (2) flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability.

The proposed rehabilitation will have no significant effect on flood stages or sediment transport characteristics.

(f) To simulate a natural stream channel.

It is not practicable to simulate a natural stream channel within the existing culvert without adversely affecting hydraulic capacity.

(g) So as not to alter sediment transport competence.

The proposed rehabilitation will have no significant effect on sediment transport competence.

Env-Wt 904.09(c)(3) – The alternative design must meet the general design criteria specified in Env-Wt 904.01:

Env-Wt 904.01
(a) Not be a barrier to sediment transport;

The proposed rehabilitation will have no significant effect on sediment transport.

(b) Prevent the restriction of high flows and maintain existing low flows;

The proposed rehabilitation will have no significant effect on high or low flows.

(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;

The proposed rehabilitation will have no effect on the movement of aquatic life.

(d) Not cause an increase in the frequency of flooding or overtopping of banks;

The proposed rehabilitation will not significantly change the existing capacity and will not cause an increase in the frequency of flooding or overtopping.

(e) Preserve watercourse connectivity where it currently exists;

The proposed rehabilitation will have no effect on watercourse connectivity.

(f) Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;

There is no practical way to restore connectivity due to the vertical drop inside the energy dissipator and the extremely steep downstream channel.

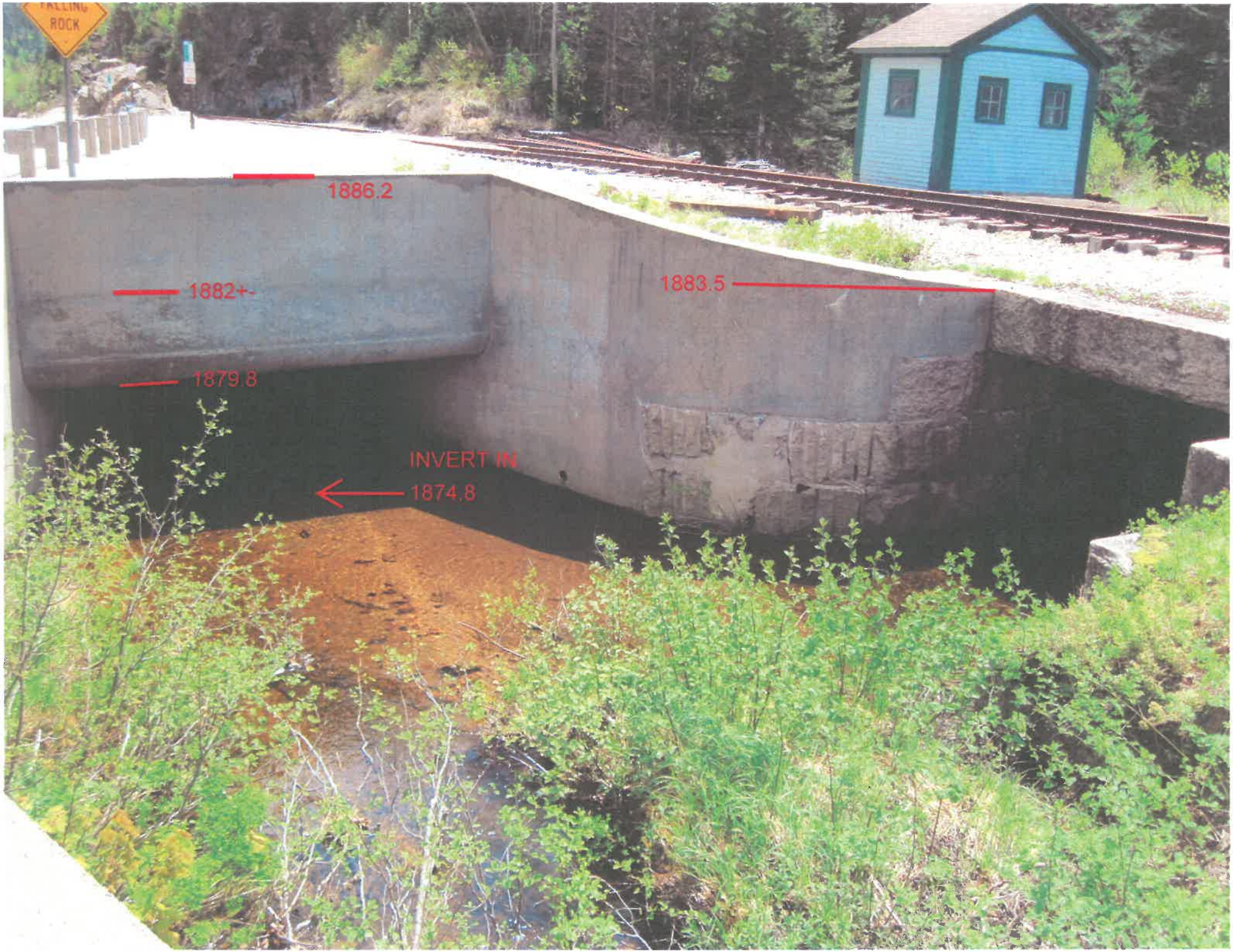
(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and

The proposed rehabilitation will not significantly change the outlet velocity and will have no effect on erosion, aggradation, or scouring.

(h) Not cause water quality degradation.

The proposed rehabilitation will have no effect on water quality. Best Management Practices will be adopted during construction of the project to ensure that water quality is protected.

*****Note: An alternative design for <u>Tier 1</u> stream crossings must meet the general design criteria (Env-Wt 904.01) only to the *maximum extent practicable*.**


ROCK
1886.2
1882+-
1883.5
1879.8
INVERT IN
1874.8

NEW HAMPSHIRE NATURAL HERITAGE BUREAU
NHB DATACHECK RESULTS LETTER

To: Rebecca Martin, NH DOT
7 Hazen Drive
PO Box 483
Concord, NH 03302

From: NH Natural Heritage Bureau

Date: 4/4/2017 (valid for one year from this date)

Re: Review by NH Natural Heritage Bureau of request submitted 3/29/2017

NHB File ID: NHB17-0942 **Applicant:** Rebecca Martin

Location: Carroll, Harts Location
26162: The culvert inlet is in the Town of Carroll, partly within the WMNF. The lower portion of the culvert is within the Town of Harts Location, partly within the highway ROW, RR ROW, & Crawford Notch State Park. Roch scaling on western side of Rte 302.

Project Description: 26162 previous NHB: NHB17-0570: The project entails rehabilitation of a ~1,000 feet long Corrugated Metal Pipe. The culvert is a Tier 3 Stream Crossing, classified as a Bridge, and carries the headwaters of the Saco River under US Route 302. The culvert is a corrugated metal plate arch originally constructed in 1958 and modified in 1961. A concrete energy dissipater is connected to the pipe outlet, which then flows to a very steep channel composed of ledge outcrops and boulders. The project proposes to rehabilitate the upper pipe with a Geopolymer liner (spray on lining) and to rehabilitate the middle and lower sections of pipe with corrugated metal liner. Rock scaling on the western side of Route 302 has been added to the project. The rock scaling will begin approximately at the town line and extend south into Crawford Notch State Park for around 1,000 linear feet. The scaling proposed could be accomplished with sand on the northbound lane, or potentially rubber mats might be utilized. A temporary signal may be utilized for alternating one-way traffic and the scaling work would take around 1 month. This work would also require some limited tree clearing at the top of the scaling area. Hand scaling and rock bolting is completed with limited access methods. The only equipment at the top of the slope is hand tools and ropes. All equipment that is used is managed form the slopes toe, wagon drill rigs are winched to the top from below.

The NH Natural Heritage database has been checked by staff of the NH Natural Heritage Bureau and/or the NH Nongame and Endangered Species Program for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government.

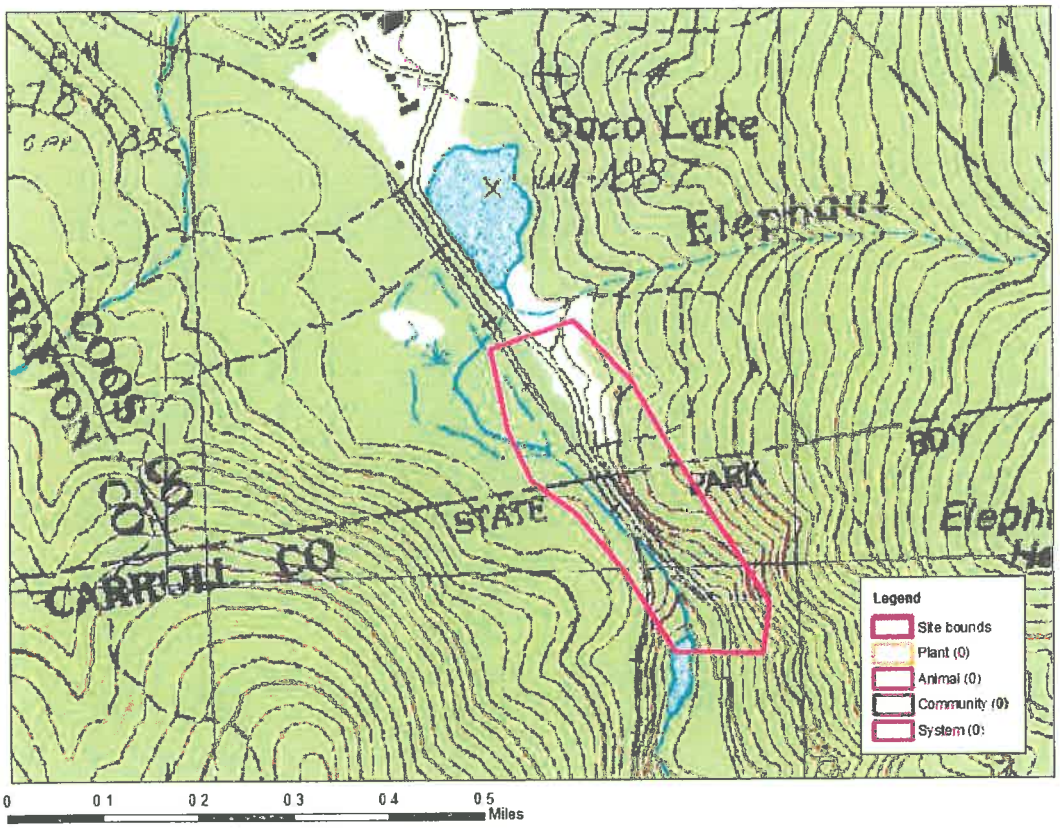
It was determined that, although there was a NHB record (e.g., rare wildlife, plant, and/or natural community) present in the vicinity, we do not expect that it will be impacted by the proposed project. This determination was made based on the project information submitted via the NHB Datacheck Tool on 3/29/2017, and cannot be used for any other project.

Department of Resources and Economic Development
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DRED/NHB
172 Pembroke Rd.
Concord, NH 03301

MAP OF PROJECT BOUNDARIES FOR: NHB17-0942

NHB17-0942



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DRED/NHB
172 Pembroke Rd.
Concord, NH 03301

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
http://www.fws.gov/newengland

In Reply Refer To:
Consultation Code: 05E1NE00-2017-SLI-1193
Event Code: 05E1NE00-2017-E-02253
Project Name: 26162 Hart's Location- Carroll

March 29, 2017

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the

human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2017-SLI-1193

Event Code: 05E1NE00-2017-E-02253

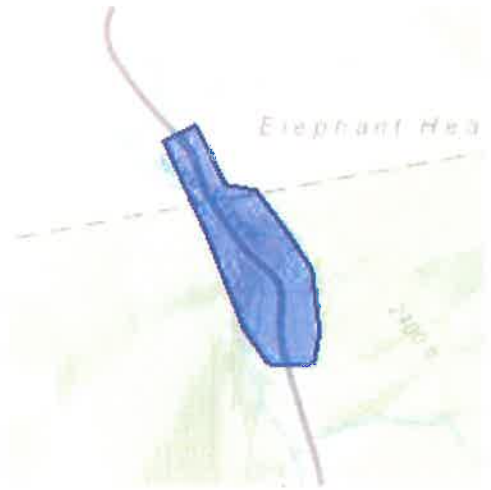
Project Name: 26162 Hart's Location- Carroll

Project Type: TRANSPORTATION

Project Description: The project entails rehabilitation of a ~1,000 feet long Corrugated Metal Pipe. The culvert is a Tier 3 Stream Crossing, classified as a Bridge, and carries the headwaters of the Saco River under US Route 302. The culvert is a corrugated metal plate arch originally constructed in 1958 and modified in 1961. A concrete energy dissipater is connected to the pipe outlet, which then flows to a very steep channel composed of ledge outcrops and boulders. The project proposes to rehabilitate the upper pipe with a Geopolymer liner (spray on lining) and to rehabilitate the middle and lower sections of pipe with corrugated metal liner.
Rock scaling on the western side of Route 302 has been added into the project. The rock scaling will begin approximately at the town line and extend south into Crawford Notch State Park for around 1,000 linear feet. The scaling proposed could be accomplished with sand on the northbound lane, or potentially rubber mats might be utilized. A temporary signal may be utilized for alternating one-way traffic and the scaling work would take around 1 month. This work would also require some limited tree clearing at the top of the scaling area. Hand scaling and rock bolting is completed with limited access methods. The only equipment at the top of the slope is hand tools and ropes. All equipment that is used is managed form the slopes toe, wagon drill rigs are winched to the top from below.

Project Location:

Approximate location of the project can be viewed in Google Maps:
https://www.google.com/maps/place/44.21217183662175N71.40537539903201W



Counties: Carroll, NH | Coos, NH

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area. Please contact the designated FWS office if you have questions.

Mammals

NAME	STATUS
Canada Lynx *(Lynx canadensis)* Population: Contiguous U.S. DPS There is a **final** critical habitat designated for this species. Your location is outside the designated critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3652	Threatened
Northern Long-eared Bat *(Myotis septentrionalis)* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Critical habitats

There are no critical habitats within your project area.

Martin, Rebecca

From: vonOettingen, Susi <susi_vonoettingen@fws.gov>
Sent: Monday, April 17, 2017 1:08 PM
To: Martin, Rebecca
Subject: Re: NLEB Question: Large Culvert to be Rehabilitated: DOT Project 26162 Harts Location- Carroll, added rock scaling?

Oh yes, very comfortable. As for other hibernacula, the closest would be in Gorham (Mascot Mine). That's quite a distance. No other known mines nearby that I'm aware of (Lyman, NH would be the next closest).

Susi

****

Susi von Oettingen
Endangered Species Biologist
New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301
(W) 603-227-6418
(Fax) 603-223-0104

www.fws.gov/newengland

On Mon, Apr 17, 2017 at 12:45 PM, Martin, Rebecca <Rebecca.Martin@dot.nh.gov> wrote:

Hello Susi,

I have received an update to the project scope for the Harts Location- Carroll, #26162 project. In addition to the culvert rehabilitation, our Bureau of Materials and Research is proposing to incorporate rock scaling. The proposed rock scaling is around 800' linear feet and will be mostly or entirely within Crawford Notch State Park/Harts Location (yellow highlighted area). The rock scaling is expected to take around 1 month to complete. Alternating one-way traffic will likely be needed during this work. The rock scaling is likely to take place between mid-April and end of May 2018. They would likely need to clear some trees at the top of the slope. Apart from the tree clearing and increase in noise, this proposed scaling is different than others I have reviewed, though I know Meli has reviewed other rock scaling projects with the FHWA Programmatic Consultation. No other bat species were listed in the Natural Heritage Bureau review for this area. I did inquire (no response yet) about known Eastern Small-Footed Bat (state endangered) hibernacula and roost sites in the area a couple of weeks ago, but have not received a response yet. Are you comfortable with the project being reviewed in accordance with the Programmatic Consultation?

Thank you,

Rebecca

From: vonOettingen, Susi [mailto:susi_vonoettingen@fws.gov]
Sent: Tuesday, March 14, 2017 3:21 PM
To: Martin, Rebecca
Subject: Re: NLEB Question: Large Culvert to be Rehabilitated: DOT Project 26162 Harts Location- Carroll

Hey there,

I think it's ok to review under the programmatic. To be honest, the only place I could think a bat might roost would be the inlet and outlet, but not the corrugated pipe. We have never seen bats using corrugated pipes.

So, I would agree with the use of the programmatic.

Susi

****

Susi von Oettingen

Endangered Species Biologist

New England Field Office

70 Commercial Street, Suite 300

Concord, NH 03301

(W) 603-223-2541 ext. 6418

www.fws.gov/newengland

On Tue, Mar 14, 2017 at 9:03 AM, Martin, Rebecca <Rebecca.Martin@dot.nh.gov> wrote:

Hello Susi,

The subject project entails rehabilitation of an approximately 1,000 foot long Corrugated Metal Arch Pipe. The culvert is a Tier 3 Stream Crossing, classified as a Bridge, and carries the headwaters of the Saco River under US Route 302. The culvert inlet is in the Town of Carroll, partly within the White Mountain National Forest and partly within the State of NH Railroad right-of-way. The lower portion of the culvert is within the Town of Harts Location, partly within the highway right-of-way, railroad right-of-way, and Crawford Notch State Park. The culvert is a corrugated metal plate arch originally constructed in 1958 and modified in 1961. A concrete energy dissipator is connected to the pipe outlet, which then flows to a very steep channel composed of ledge outcrops and boulders. The project proposes to rehabilitate the upper pipe with a Geopolymer liner (spray on lining) and to rehabilitate the lower section of pipe with a corrugated metal liner. The existing culvert varies from 87" high and 137" wide to 71" high and 103" wide. Much of the pipe is under US Route 302.

For safety reasons, I can not go inside of the pipe to inspect it for signs of bat use. I have attached a couple of photos of the inlet (IMGP4116 and IMGP 4136), which is relatively easy to access. I have also attached a couple of pictures of the outlet and energy dissipator (IMGP4184, IMGP4168), which is a bit more challenging to access. We would prefer to review this project under the FHWA Programmatic Consultation. However, I wanted to check with you if this would be appropriate since any inspection for bat use would only be of the inlet and outlet.

Thank you,

Rebecca Martin

Environmental Manager

NH DOT Bureau of Environment

7 Hazen Drive

Concord, NH 03302

(603)271-6781

Rebecca.Martin@dot.nh.gov

---------- Forwarded message ----------
From: "Martin, Rebecca" <Rebecca.Martin@dot.nh.gov>
To: "Lamb, Amy" <Amy.Lamb@dred.nh.gov>
Cc:
Bcc:
Date: Wed, 5 Apr 2017 15:33:25 +0000
Subject: RE: NHB review: NHB17-0942

Hi Amy,

Thank you for looking at this project. I believe that NHB is helpfully buffering out the NLEB hibernacula to 0.5 miles and maternity roost trees to 0.25 so that NH DOT can complete coordination in accordance with the FHWA Programmatic Consultation.

I was wondering if NH Fish and Game had also provided data about known Eastern Small-Footed Bat (state endangered) hibernacula and roost sites after our meeting at the end of 2016 about data sharing? I ask because I was recently reminded that ESFB use rock outcrops for roosting and the ESFB info on the NH Fish and Game site mentions that 'During summer, small-footed bats have been captured at 3 locations in New Hampshire, including the White Mountain National Forest' http://www.wildlife.state.nh.us/nongame/documents/eastern-small-foot.pdf

The map on page 7 shows Bartlett (south of Harts Location) as having confirmed ESFB observations. This might not be a concern since the rock scaling is in the northern part of Harts Location near the border with Carroll and the ESFB observation appears to be in Bartlett.

Regards,

Rebecca

From: Lamb, Amy
Sent: Tuesday, April 4, 2017 4:04 PM
To: Martin, Rebecca
Subject: NHB review: NHB17-0942

Attached, please find the review we have completed. Contact me if you have any further questions or problems with the attachments.

Best,
Amy

Amy Lamb
Ecological Information Specialist

NH Natural Heritage Bureau
DRED - Forest & Lands
172 Pembroke Rd
Concord, NH 03301
603-271-2215 ext. 323

New Hampshire DOT
Department of Transportation

THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

CHRISTOPHER D. CLEMENT, SR.
COMMISSIONER

RECEIVED
OCT 22 2014

JEFF BRILLHART, P.E.
ASSISTANT COMMISSIONER

RECEIVED
BUREAU OF ENVIRONMENT
OCT 29 2014
NH DEPARTMENT OF TRANSPORTATION

HARTS LOCATION-CARROLL
X-A003(275)
26162 RPR 4978

No Historic Properties Affected Memo

Pursuant to the meeting and discussions on October 9, 2014, and for the purpose of compliance with regulations of the National Historic Preservation Act and the Advisory Council on Historic Preservation's *Procedures for the Protection of Historic Properties* (36 CFR 800), the NH Division of Historical Resources (NHDHR) and the NH Division of the Federal Highway Administration (FHWA) have coordinated the identification and evaluation of historical and archaeological resources with plans to replace in kind or install an internal structural lining to the deteriorated corrugated metal pipe sections of Bridge (055/091) carrying the headwaters of the Saco River under U.S. Route 302 in Crawford Notch State Park and the White Mountain National Forest, in the towns of Harts Location and Carroll, New Hampshire. The structure, measuring approximately 1,000 feet in length, was constructed in 1958 and modified in 1961. It consists of a concrete inlet, followed by three segments of corrugated metal pipe arch, and ends at a concrete energy dissipator. Rehabilitation or replacement will be confined to previously disturbed areas and will leave the concrete inlet and energy dissipator intact.

Based on a review pursuant to 36 CFR 800.4, we agree that no historic or archaeological resources are affected in the project area and that no further survey work is needed. Adjacent railroad elements will not be impacted. If the inlet or outlet is impacted, an individual inventory form will be completed and project consultation will continue.

In accordance with the Advisory Council's regulations, we will continue to consult, as appropriate, as this project proceeds.

Patrick Bauer, Administrator — Date 10/30/14
Federal Highway Administration
GOR

Jill Edelmann — Date 10/20/2014
Cultural Resources Manager

Concurred with by the NH State Historic Preservation Officer:

for Elizabeth H. Muzzey — Date 10-29-14
State Historic Preservation Officer
NH Division of Historical Resources

c.c. Chris St. Louis, NHDHR; Jamie Sikora, FHWA; Christine Perron, NHDOT; Jim Marshall, NHDOT; Seth Prescott, DRED; Bill Dauer, WMNF

S:\Environment\PROJECTS\DESIGN\26162\Cultural\Harts Location 26162 NoHistoricPropAffectedFHWA.docx

US Army Corps of Engineers
New England District

U.S. Army Corps of Engineers
New Hampshire Programmatic General Permit (PGP)
Appendix B - Corps Secondary Impacts Checklist
(for inland wetland/waterway fill projects in New Hampshire)

1. Attach any explanations to this checklist. Lack of information could delay a Corps permit determination.
2. All references to "work" include all work associated with the project construction and operation. Work includes filling, clearing, flooding, draining, excavation, dozing, stumping, etc.
3. See PGP, GC 5 regarding single and complete projects.
4. Contact the Corps at (978) 318-8832 with any questions.

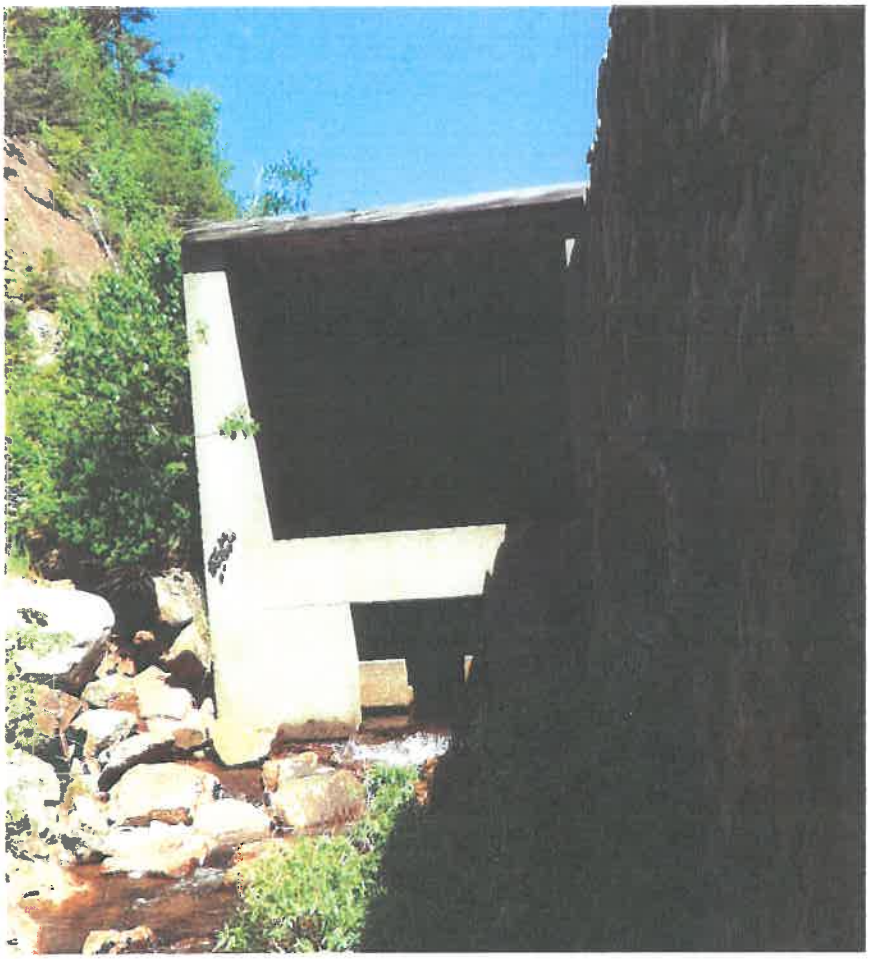
1. Impaired Waters	Yes	No
1.1 Will any work occur within 1 mile upstream in the watershed of an impaired water? See http://des.nh.gov/organization/divisions/water/wmb/section401/impaired_waters.htm to determine if there is an impaired water in the vicinity of your work area.*		No
2. Wetlands	Yes	No
2.1 Are there are streams, brooks, rivers, ponds, or lakes within 200 feet of any proposed work?	Yes	
2.2 Are there proposed impacts to SAS, shellfish beds, special wetlands and vernal pools (see PGP, GC 26 and Appendix A)? Applicants may obtain information from the NH Department of Resources and Economic Development Natural Heritage Bureau (NHB) website, www.nhnaturalheritage.org, specifically the book Natural Community Systems of New Hampshire.		No
2.3 If wetland crossings are proposed, are they adequately designed to maintain hydrology, sediment transport & wildlife passage?	Yes	
2.4 Would the project remove part or all of a riparian buffer? (Riparian buffers are lands adjacent to streams where vegetation is strongly influenced by the presence of water. They are often thin lines of vegetation containing native grasses, flowers, shrubs and/or trees that line the stream banks. They are also called vegetated buffer zones.)		No
2.5 The overall project site is more than 40 acres. (Site Area 3.8 acres)		No
2.6 What is the size of the existing impervious surface area?	1.8 acres	
2.7 What is the size of the proposed impervious surface area?	1.8 acres	
2.8 What is the % of the impervious area (new and existing) to the overall project site?	47%	
3. Wildlife	Yes	No
3.1 Has the NHB determined that there are known occurrences of rare species, exemplary natural communities, Federal and State threatened and endangered species and habitat, in the vicinity of the proposed project? (All projects require a NHB determination.)		No
3.2 Would work occur in any area identified as either "Highest Ranked Habitat in N.H." or "Highest Ranked Habitat in Ecological Region"? (These areas are colored magenta and green, respectively, on NH Fish and Game's map, "2010 Highest Ranked Wildlife Habitat by Ecological Condition.") Map information can be found at: • PDF: www.wildlife.state.nh.us/Wildlife/Wildlife_Plan/highest_ranking_habitat.htm. • Data Mapper: www.granit.unh.edu. • GIS: www.granit.unh.edu/data/downloadfreedata/category/databycategory.html.		No
3.3 Would the project impact more than 20 acres of an undeveloped land block (upland, wetland/waterway) on the entire project site and/or on an adjoining property(s)?		No
3.4 Does the project propose more than a 10-lot residential subdivision, or a commercial or industrial development?		No
3.5 Are stream crossings designed in accordance with the PGP, GC 21?	Yes	

4. Flooding/Floodplain Values	Yes	No
4.1 Is the proposed project within the 100-year floodplain of an adjacent river or stream?		No
4.2 If 4.1 is yes, will compensatory flood storage be provided if the project results in a loss of flood storage? N/A		
5. Historic/Archaeological Resources		
If a minor or major impact project, has a copy of the Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) been sent to the NH Division of Historical Resources as required on Page 5 of the PGP?**	Yes	

*Although this checklist utilizes state information, its submittal to the Corps is a Federal requirement.
** If project is not within Federal jurisdiction, coordination with NH DHR is not required under Federal law.

NH DOT Wetland Permit Application- Hart's Location Carroll 26162
Structure Outlet- Impact Area A is inside the dissipator- all debris from pipe cleaning will be collected within the energy dissipator and the clean water bypass will discharge into the dissipator.

June 16, 2016- facing north towards outlet, taken from Saco River



October 24, 2016- facing north towards outlet, taken from road shoulder adjacent to retaining wall

NH DOT Wetland Permit Application- Hart's Location Carroll 26162
June 16, 2016- photo taken with camera pointing into dissipator from above adjacent to the outlet

NH DOT Wetland Permit Application- Hart's Location Carroll 26162
June 16, 2016- facing south towards outlet, taken from beside Route 302 on top of culvert, minor repairs to a stone retaining wall are proposed

Structure Inlet- Impact Area B- the water diversion will be constructed within the limits of the concrete pad at the inlet.

June 16, 2016- photo taken from rock ledge above the culvert inlet facing west towards wetland west of the RR.

NH DOT Wetland Permit Application- Hart's Location Carroll 26162

June 16, 2016- from adjacent to Route 302 facing south into inlet, RR to right of the photo

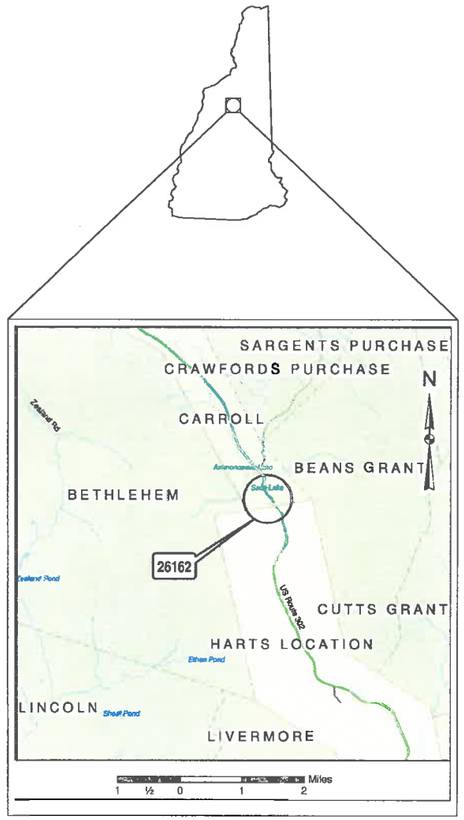
June 16, 2016- from the Saco River facing south into the inlet, minor concrete repairs intended.

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

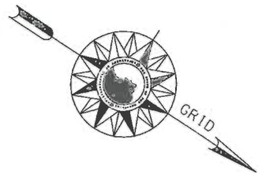
WETLANDS PLANS
FEDERAL AID PROJECT

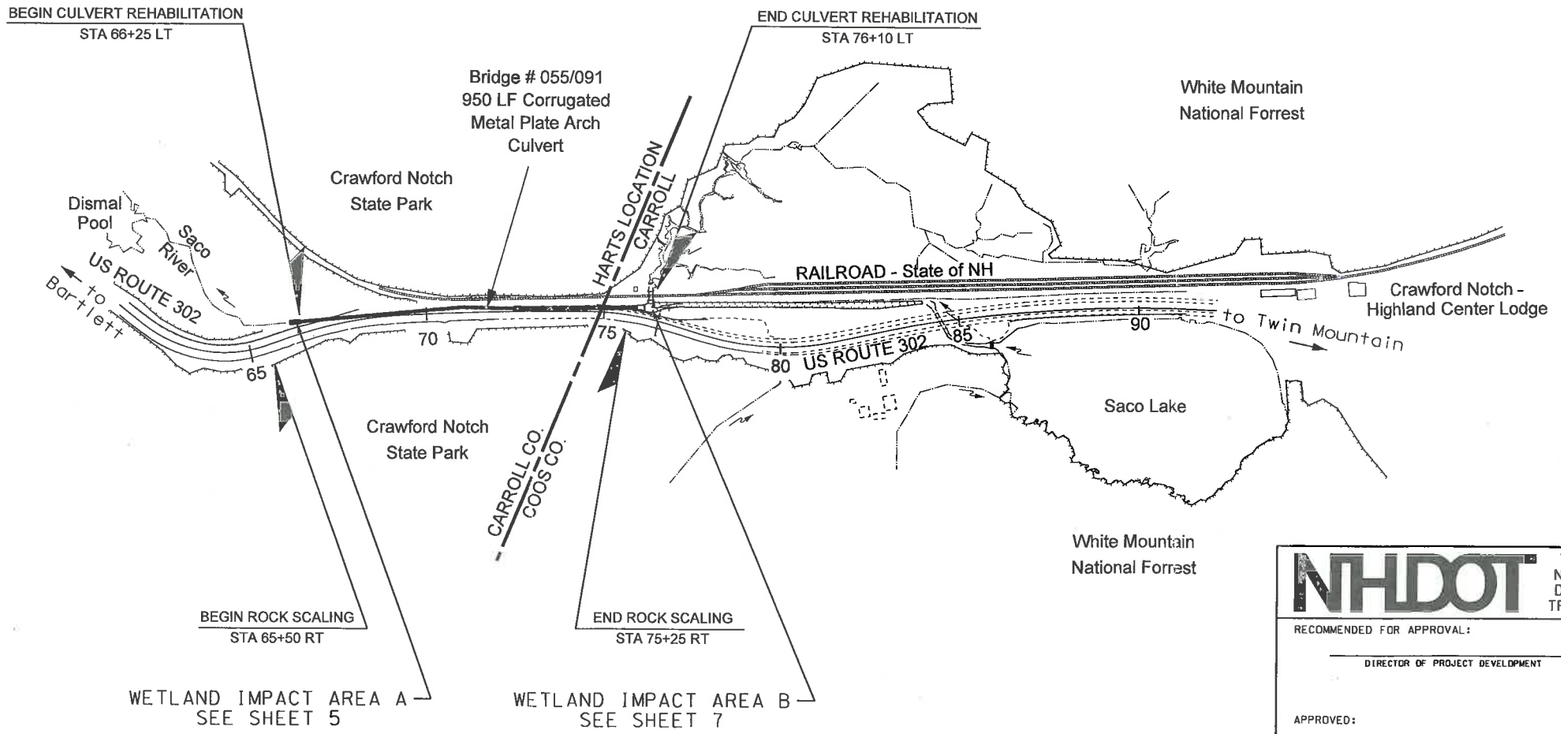
X-A003(275)
N.H. PROJECT NO. 26162
U.S. ROUTE 302

DESIGN DATA	
AVERAGE DAILY TRAFFIC 20 14	2300
AVERAGE DAILY TRAFFIC 20 XX	XX
PERCENT OF TRUCKS	11%
DESIGN SPEED	50 MPH
LENGTH OF PROJECT	1770 FT



LOCATION MAP





DELINEATION BY M. URBAN
AND R. MARTIN, JUNE 2016

INDEX OF SHEETS

TOWNS OF CARROLL AND HARTS LOCATION
COUNTIES OF CARROLL AND COOS
SCALE: 1" = 200'

DATE 5/4/2017

DRAWN BY	DRH
DATE	2016
CHECKED BY	CAC
DATE	4/2017

NHDOT THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

RECOMMENDED FOR APPROVAL:
DIRECTOR OF PROJECT DEVELOPMENT — DATE

APPROVED:
ASSISTANT COMMISSIONER AND CHIEF ENGINEER — DATE

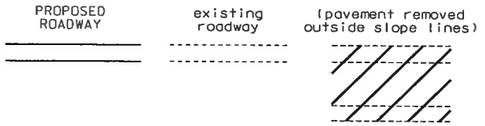
U. S. DEPARTMENT OF
TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED:
DIVISION ADMINISTRATOR — DATE

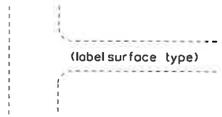
FEDERAL PROJECT NO.	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
X-A003(275)	26162	1	11

GENERAL

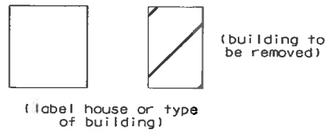
EDGE OF PAVEMENT
TRAVELED WAY



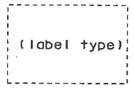
DRIVEWAYS



BUILDINGS

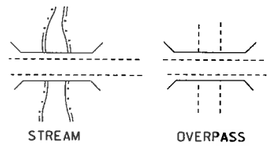


FOUNDATION

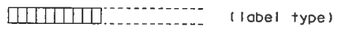


LEACH FIELD

BRIDGE CROSSINGS

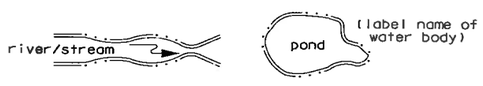


STEPS AND WALK



INTERMITTENT WATER COURSE

SHORE LINE



POTENTIAL WET AREA SYMBOL

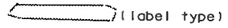
BRUSH OR WOODS LINE

TREES (PLANS)

TREE OR STUMP (CROSS-SECTIONS)

(show station, circumference in feet & type)

HEDGE

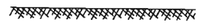


MONITORING WELL

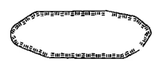
WELL

FLAG POLE

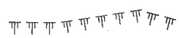
ORIGINAL GROUND (TYPICALS)



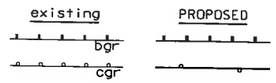
ROCK OUTCROP



ROCK LINE (TYPICALS & SECTIONS ONLY)



GUARDRAIL (label type)



JERSEY BARRIER

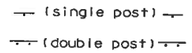
CURB (LABEL TYPE)

STONE WALL

RETAINING WALL (LABEL TYPE)

FENCE (LABEL TYPE)

SIGNS



GAS PUMP

FUEL TANK (ABOVE GROUND)

(label size & type)

STORAGE TANK FILLER CAP

SEPTIC TANK

GRAVE

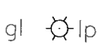
MAILBOX

VENT PIPE

SATELLITE DISH ANTENNA

PHONE

GROUND LIGHT/LAMP POST



BORING LOCATION

TEST PIT

INTERSTATE NUMBERED HIGHWAY

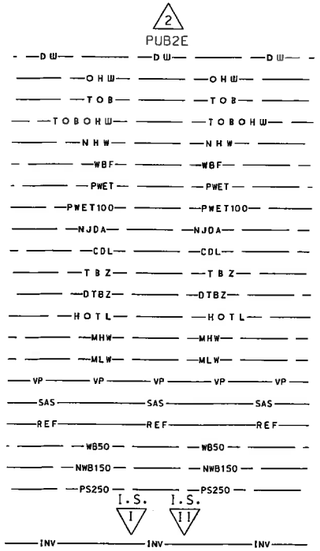
UNITED STATES NUMBERED HIGHWAY

STATE NUMBERED HIGHWAY

SHORELAND - WETLAND

WETLAND DESIGNATION AND TYPE

DELINEATED WETLAND
ORDINARY HIGH WATER
TOP OF BANK
TOP OF BANK & ORDINARY HIGH WATER
NORMAL HIGH WATER
WIDTH AT BANK FULL
PRIME WETLAND
PRIME WETLAND 100' BUFFER
NON-JURISDICTIONAL DRAINAGE AREA
COWARDIN DISTINCTION LINE
TIDAL BUFFER ZONE
DEVELOPED TIDAL BUFFER ZONE
HIGHEST OBSERVABLE TIDE LINE
MEAN HIGH WATER
MEAN LOW WATER
VERNAL POOL
SPECIAL AQUATIC SITE
REFERENCE LINE
WATER FRONT BUFFER
NATURAL WOODLAND BUFFER
PROTECTED SHORELAND



INVASIVE SPECIES LABEL

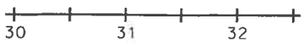
INVASIVE SPECIES

FLOODPLAIN / FLOODWAY

500 YEAR FLOODPLAIN BOUNDARY
100 YEAR FLOODPLAIN BOUNDARY
FLOODWAY

ENGINEERING

CONSTRUCTION BASELINE



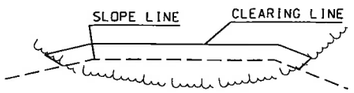
PC, PT, POT (ON CONST BASELINE)

PI (IN CONSTRUCTION BASELINES)

INTERSECTION OR EQUATION OF TWO LINES

ORIGINAL GROUND LINE (PROFILES AND CROSS-SECTIONS)

PROFILE GRADE LINE (PROFILES AND CROSS-SECTIONS)



CLEARING LINE
SLOPE LINE
SLOPE LINE (FILL)

SLOPE LINE (CUT)

PROFILES AND CROSS SECTIONS:
ORIGINAL GROUND ELEVATION (LEFT)
FINISHED GRADE ELEVATION (RIGHT)

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11-21-2014	26162 stdsymb1_2	26162	2	11

DRAINAGE

MANHOLE

CATCH BASIN — cb

DROP INLET — di

(existing) (PROPOSED)

DRAINAGE PIPE (existing) — (label size & type)

DRAINAGE PIPE (PROPOSED)

UNDERDRAIN (existing) W/ FLUSHING BASIN — fb — (label size & type)

UNDERDRAIN (PROPOSED) W/ FLUSHING BASIN

show direction of flow

HEADER (existing & PROPOSED) — (with stone outlet protection)

END SECTION (existing & PROPOSED) — METAL or PLASTIC — RCP

OPEN DITCH (PROPOSED)

EROSION CONTROL/ STONE SLOPE PROTECTION

BOUNDARIES / RIGHT-OF-WAY

RIGHT-OF-WAY LINE — (label type)

RR RIGHT-OF-WAY LINE

PROPERTY LINE — PL

PROPERTY LINE (COMMON OWNER) — Z

TOWN LINE — BOW / CONCORD

COUNTY LINE — COOS / GRAFTON

STATE LINE — MAINE / NEW HAMPSHIRE

NATIONAL FOREST

CONSERVATION LAND — LC

BENCH MARK / SURVEY DISK

BOUND — (PROPOSED) — bnd

STATE LINE/ TOWN LINE MONUMENT — S/L — T/L

NHDOT PROJECT MARKER

IRON PIPE OR PIN — ip

DRILL HOLE IN ROCK — dh

TAX MAP AND LOT NUMBER — 156 14 — 1642/341 — 6.80 Ac.±

PROPERTY PARCEL NUMBER — 12

HISTORIC PROPERTY — H

UTILITIES

TELEPHONE POLE

POWER POLE

JOINT OCCUPANCY

MISCELLANEOUS/UNKNOWN POLE

GUY POLE OR PUSH BRACE

LIGHT POLE

LIGHT ON POWER POLE

LIGHT ON JOINT POLE

existing — PROPOSED — (plot point at face not center of symbol)

POLE STATUS:
REMOVE, LEAVE, PROPOSED, OR TEMPORARY AS APPLICABLE e.g.:

R L — P+04 25.0' — T+04 25.0'

RAILROAD — (label ownership)

RAILROAD SIGN

RAILROAD SIGNAL

UTILITY JUNCTION BOX — jb — JB

OVERHEAD WIRE — OW — (label type)

UNDERGROUND UTILITIES

WATER (on existing lines label size, type and note if abandoned) — W — PW

SEWER — S — PS

TELEPHONE — T — PT

ELECTRIC — E — PE

GAS — G — PG

LIGHTING — L — PL

INTELLIGENT TRANSPORTATION SYSTEM — ITS — PITS

FIBER OPTIC — FO — PFO

WATER SHUT OFF — WSO

GAS SHUT OFF — GSO

HYDRANT — HYD

MANHOLES

SEWER — MHS

TELEPHONE — MHT

ELECTRICAL — MHE

GAS — MHG

UNKNOWN — MHU

TRAFFIC SIGNALS / ITS

	existing	PROPOSED
MAST ARM (existing)		30' MA (NOTE ANGLE FROM ℄)
OPTICOM RECEIVER		
OPTICOM STROBE		
TRAFFIC SIGNAL		
PEDESTAL WITH PEDESTRIAN SIGNAL HEADS AND PUSH BUTTON UNIT		
SIGNAL CONDUIT	-C-C-C-	-PC-PC-PC-
CONTROLLER CABINET	cc	CC
METER PEDESTAL	mp	MP
PULL BOX	pb	PB
LOOP DETECTOR (QUADRUPOLE)		(label size)
LOOP DETECTOR (RECTANGULAR)		(label size)
CAMERA POLE (CCTV)		
FIBER OPTIC DELINEATOR	fod	FOD
FIBER OPTIC SPLICE VAULT		SVF
ITS EQUIPMENT CABINET	its	ITS
VARIABLE SPEED LIMIT SIGN		
DYNAMIC MESSAGE SIGN		
ROAD AND WEATHER INFO SYSTEM		

CONSTRUCTION NOTES

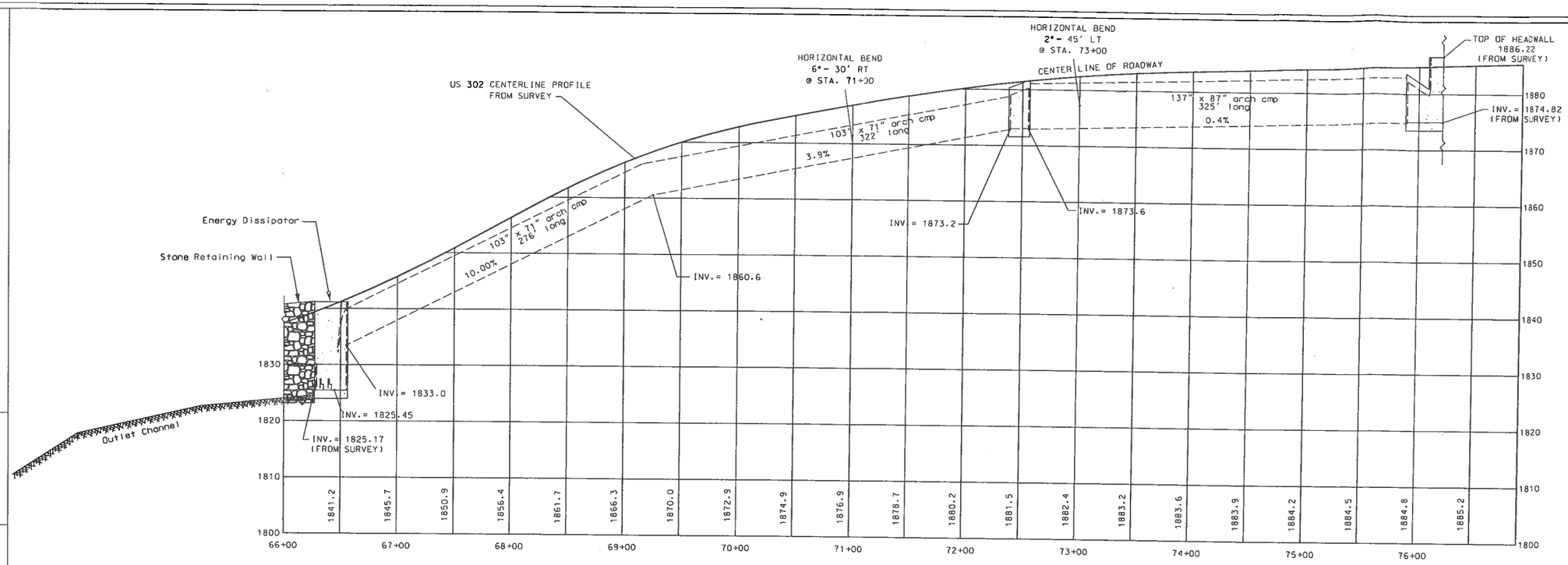
CURB MARK NUMBER - BITUMINOUS	B-1
CURB MARK NUMBER - GRANITE	G-1
CLEARING AND GRUBBING AREA	A
DRAINAGE NOTE	1
EROSION CONTROL NOTE	A
FENCING NOTE	A
GUARDRAIL NOTE	1
ITS NOTE	1
LIGHTING NOTE	A
TRAFFIC SIGNAL NOTE	1

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

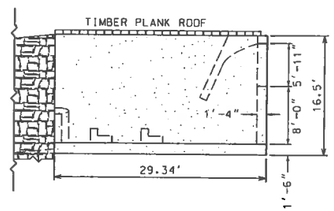
REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
9-1-2016	26162 stdsymb1_2	26162	3	11

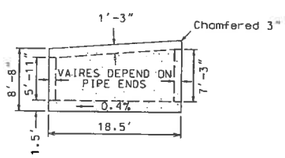


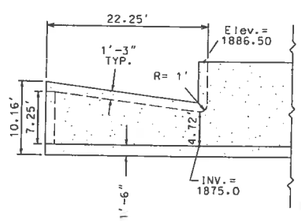
PROFILE

SCALE:
1"= 50' HORIZ.
1"= 10' VERT.

INFORMATION ON THIS SHEET HAS BEEN REPRODUCED FROM AS-BUILT PLANS, PROJECT ER-39(1), DATED 1961, UNLESS OTHERWISE NOTED.

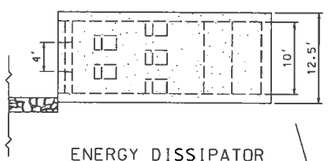




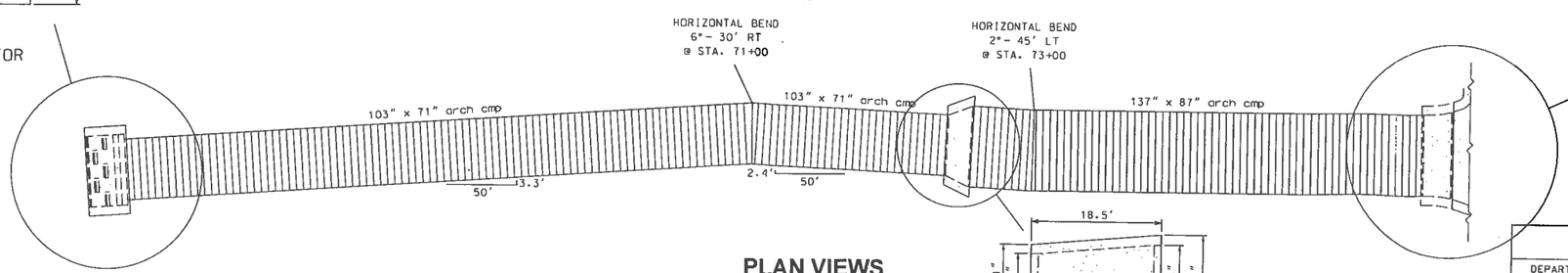


ELEVATION VIEWS

NOT TO SCALE



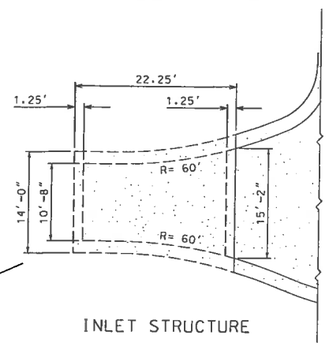
ENERGY DISSIPATOR



PLAN VIEWS

NOT TO SCALE

CONCRETE TRANSITION



INLET STRUCTURE

REVISIONS AFTER PROPOSAL

STATION	DESCRIPTION	STATION	DATE	NUMBER	DATE

SDR PROCESSED	DRH	DATE	2012
NEW DESIGN		DATE	4/2017
SHEET CHECKED	CAC	DATE	
AS BUILT DETAILS		DATE	

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

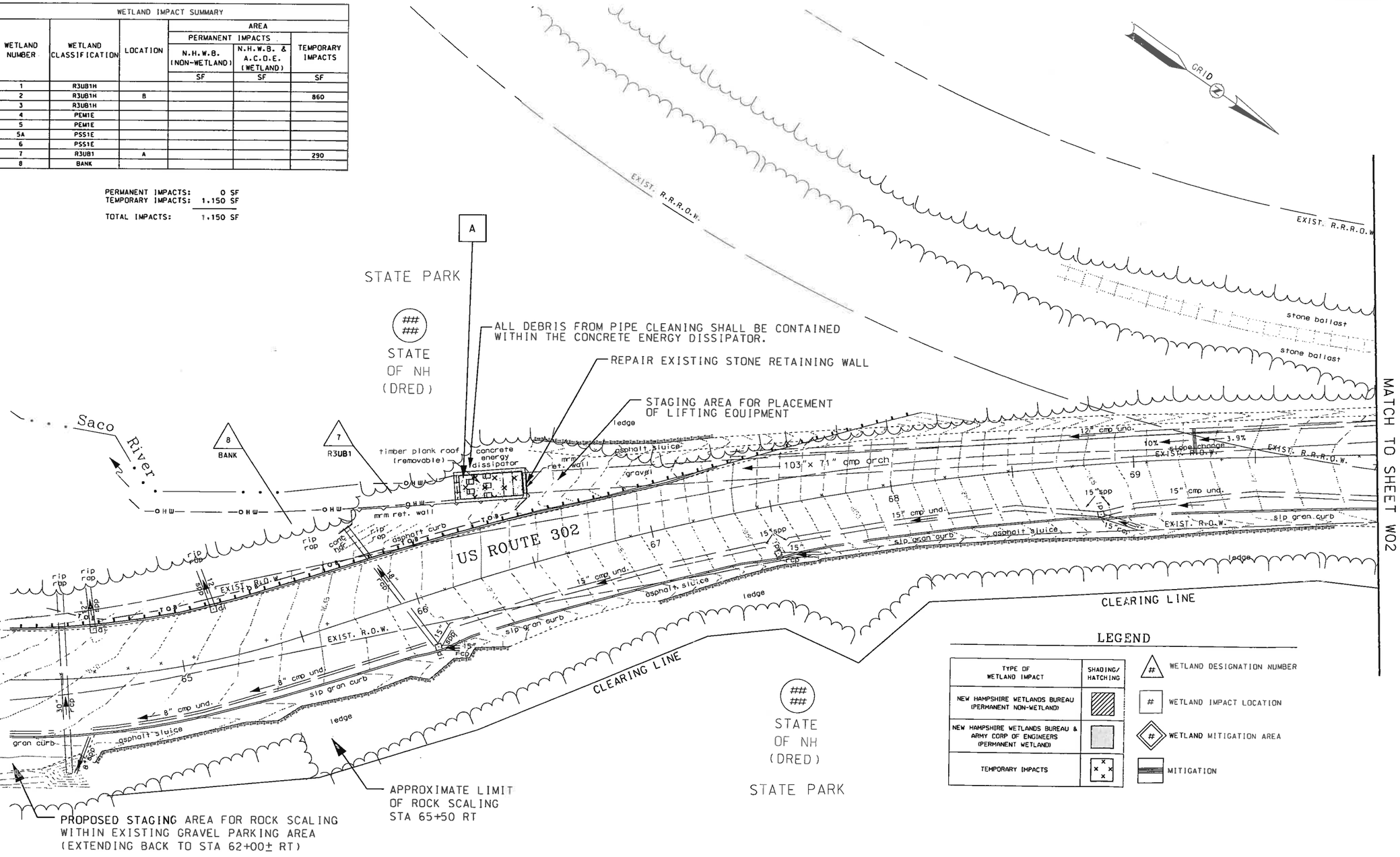
AS-BUILT PLAN AND PROFILE DETAILS

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
26162 plan_profile copy 26162		4	11

WETLAND IMPACT SUMMARY					
WETLAND NUMBER	WETLAND CLASSIFICATION	LOCATION	AREA		
			PERMANENT IMPACTS		TEMPORARY IMPACTS
			N.H.W.B. (NON-WETLAND)	N.H.W.B. & A.C.O.E. (WETLAND)	
			SF	SF	SF
1	R3UB1H				
2	R3UB1H	B			860
3	R3UB1H				
4	PEM1E				
5	PEM1E				
5A	PSS1E				
6	PSS1E				
7	R3UB1	A			290
8	BANK				

PERMANENT IMPACTS: 0 SF
TEMPORARY IMPACTS: 1,150 SF

TOTAL IMPACTS: 1,150 SF



LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING
NEW HAMPSHIRE WETLANDS BUREAU (PERMANENT NON-WETLAND)	
NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)	
TEMPORARY IMPACTS	

- # — WETLAND DESIGNATION NUMBER
- # — WETLAND IMPACT LOCATION
- # — WETLAND MITIGATION AREA
- MITIGATION

WETLAND CLASSIFICATION CODES	
PEM1E	PALUSTRINE, EMERGENT, PERSISTENT, SEASONALLY FLOODED/SATURATED
PSS1E	PALUSTRINE, SCRUB-SHRUB, BROAD-LEAVED DECIDUOUS, SEASONALLY FLOODED/SATURATED
R3UB1H	RIVERINE, UPPER PERENNIAL, UNCONSOLIDATED BOTTOM, COBBLE-GRAVEL, PERMANENTLY FLOODED
R3UB1	RIVERINE, UPPER PERENNIAL, UNCONSOLIDATED BOTTOM, COBBLE-GRAVEL

Contour Interval = 1 Foot

Delineation by M. Urban & R. Martin, June 2016.

20 0 20 40
SCALE IN FEET

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	DATE	STATION

SDR PROCESSED DRH DATE
NEW DESIGN DATE 2016
SHEET CHECKED CAC DATE 4/2017
AS BUILT DETAILS DATE

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

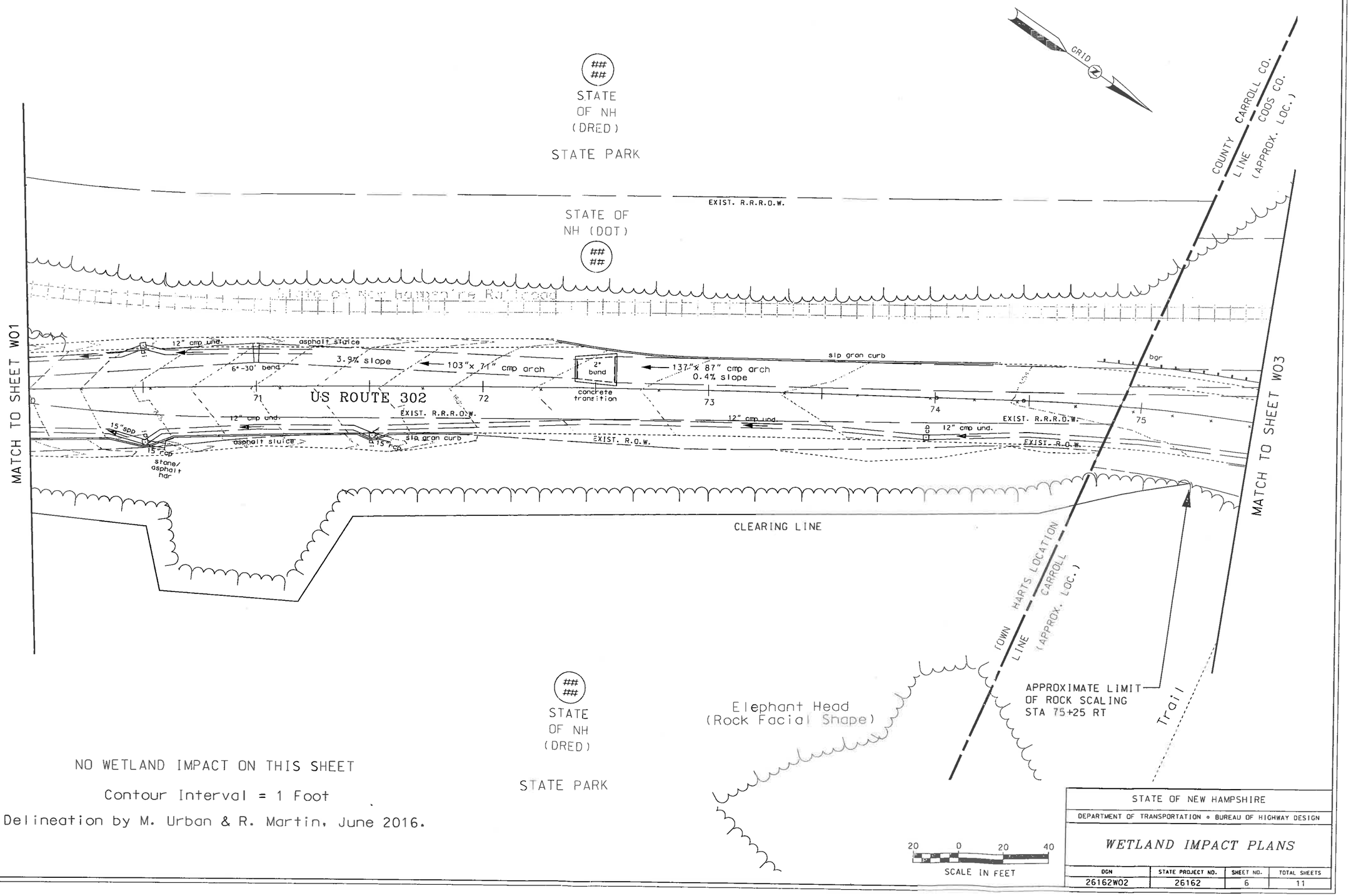
WETLAND IMPACT PLANS

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
26162W01	26162	5	11

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	STATION	STATION	DATE

		DATE
SDR PROCESSED		
NEW DESIGN	DRH	DATE 2016
SHEET CHECKED	CAC	DATE 4/2017
AS BUILT DETAILS		DATE



NO WETLAND IMPACT ON THIS SHEET

Contour Interval = 1 Foot

Delineation by M. Urban & R. Martin, June 2016.

20 0 20 40
SCALE IN FEET

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
26162W02	26162	6	11

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	STATION	DATE

SDR PROCESSED DATE

NEW DESIGN DRH DATE 2016

SHEET CHECKED CAC DATE 4/2017

AS BUILT DETAILS DATE

MATCH TO SHEET W02

Trail

REPAIR BOTTOM CORNERS
INSIDE CONCRETE INLET

STATE OF
NH (DOT)

U.S.A.
(WHITE MOUNTAIN
NATIONAL FOREST)

U.S.A.
(WHITE MOUNTAIN
NATIONAL FOREST)

U.S.A.
(WHITE MOUNTAIN
NATIONAL FOREST)

GRID

4 PEM1E

1 R3UB1H

B

5 PEM1E

2 R3UB1H

6 PSS1E

5 PSS1E

3 R3UB1H

EXIST. R.R.R.O.W.

EXIST. R.R.R.O.W.

stone ballast

stone ballast

Railroad Bridge

Concrete Inlet

137"x 87" cmp arch

EXIST. R.R.R.O.W.

concrete pad

Concrete ret wall

EXIST. R.O.W.

EXIST. R.O.W.

EXIST. R.O.W.

EXIST. R.O.W. P-3190

EXIST. C.A.R.O.W. P-4890

EXIST. R.O.W.

EXIST. R.O.W.

EXIST. C.A.R.O.W. P-4890

EXIST. R.O.W.

TOBOHW

DW

STAGING AREA FOR PLACEMENT OF LIFTING EQUIPMENT

STOCKPILE, STAGING AREA AND FIELD OFFICE (WITHIN EXISTING PARKING AREA)

asphalt / gravel parking

asphalt / gravel parking

18" rcp

18" rcp CB

24" rcp CB

76

77

78

79

80

81

US ROUTE 302

Contour Interval = 1 Foot

Delineation by M. Urban & R. Martin, June 2016.

20 0 20 40
SCALE IN FEET

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
26162W03	26162	7	11

EROSION CONTROL STRATEGIES

1. ENVIRONMENTAL COMMITMENTS:
   - 1.1. THESE GUIDELINES DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH ANY CONTRACT PROVISIONS, OR APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.
   - 1.2. THIS PROJECT WILL BE SUBJECT TO THE US EPA'S NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORM WATER CONSTRUCTION GENERAL PERMIT AS ADMINISTERED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA). THIS PROJECT IS SUBJECT TO REQUIREMENTS IN THE MOST RECENT CONSTRUCTION GENERAL PERMIT (CGP).
   - 1.3. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE NHDES WETLAND PERMIT. THE US ARMY CORPS OF ENGINEERS PERMIT, WATER QUALITY CERTIFICATION AND THE SPECIAL ATTENTION ITEMS INCLUDED IN THE CONTRACT DOCUMENTS.
   - 1.4. ALL STORM WATER, EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE NEW HAMPSHIRE STORMWATER MANUAL, VOLUME 3, EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION (DECEMBER 2008) (BMP MANUAL) AVAILABLE FROM THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES (NHDES).
   - 1.5. THE CONTRACTOR SHALL COMPLY WITH RSA 485-A:17, AND ALL, PUBLISHED NHDES ALTERATION OF TERRAIN ENV-WQ 1500 REQUIREMENTS (HTTP://DES.NH.GOV/ORGANIZATION/COMMISSIONER/LEGAL/RULES/INDEX.HTM)
   - 1.6. THE CONTRACTOR IS DIRECTED TO REVIEW AND COMPLY WITH SECTION 107.1 OF THE CONTRACT AS IT REFERS TO SPILLAGE, AND ALSO WITH REGARDS TO EROSION, POLLUTION, AND TURBIDITY PRECAUTIONS.

2. STANDARD EROSION CONTROL SEQUENCING APPLICABLE TO ALL CONSTRUCTION PROJECTS:
   - 2.1. PERIMETER CONTROLS SHALL BE INSTALLED PRIOR TO EARTH DISTURBING ACTIVITIES. PERIMETER CONTROLS AND STABILIZED CONSTRUCTION EXITS SHALL BE INSTALLED AS SHOWN IN THE BMP MANUAL AND AS DIRECTED BY THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) PREPARER.
   - 2.2. EROSION, SEDIMENTATION CONTROL MEASURES AND INFILTRATION BASINS SHALL BE CLEANED, REPLACED AND AUGMENTED AS NECESSARY TO PREVENT SEDIMENTATION BEYOND PROJECT LIMITS THROUGHOUT THE PROJECT DURATION.
   - 2.3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED IN ACCORDANCE WITH THE CONSTRUCTION GENERAL PERMIT AND SECTION 645 OF THE NHDOT SPECIFICATIONS FOR ROAD AND BRIDGES CONSTRUCTION.
   - 2.4. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
     - (A) BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
     - (B) A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
     - (C) A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP-RAP HAS BEEN INSTALLED;
     - (D) TEMPORARY SLOPE STABILIZATION CONFORMING TO TABLE 1 HAS BEEN PROPERLY INSTALLED
   - 2.5. ALL STOCKPILES SHALL BE CONTAINED WITH A PERIMETER CONTROL. IF THE STOCKPILE IS TO REMAIN UNDISTURBED FOR MORE THAN 14 DAYS, MULCHING WILL BE REQUIRED.
   - 2.6. A WATER TRUCK SHALL BE AVAILABLE TO CONTROL EXCESSIVE DUST AT THE DIRECTION OF THE CONTRACT ADMINISTRATOR.
   - 2.7. TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES SHALL REMAIN UNTIL THE AREA HAS BEEN PERMANENTLY STABILIZED.
   - 2.8. CONSTRUCTION PERFORMED ANY TIME BETWEEN NOVEMBER 30" AND MAY 1" OF ANY YEAR SHALL BE CONSIDERED WINTER CONSTRUCTION AND SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.
     - (A) ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15". OR WHICH ARE DISTURBED AFTER OCTOBER 15", SHALL BE STABILIZED IN ACCORDANCE WITH TABLE 1.
     - (B) ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15". OR WHICH ARE DISTURBED AFTER OCTOBER 15", SHALL BE STABILIZED TEMPORARILY WITH STONE OR IN ACCORDANCE WITH TABLE 1.
     - (C) AFTER NOVEMBER 30" INCOMPLETE ROAD SURFACES, WHERE WORK HAS STOPPED FOR THE SEASON, SHALL BE PROTECTED IN ACCORDANCE WITH TABLE 1.
     - (D) WINTER EXCAVATION AND EARTHWORK SHALL BE DONE SUCH THAT NO MORE THAN 1 ACRE OF THE PROJECT IS WITHOUT STABILIZATION AT ONE TIME, UNLESS A WINTER CONSTRUCTION PLAN HAS BEEN APPROVED BY NHDOT THAT MEETS THE REQUIREMENTS OF ENV-WQ 1505.02 AND ENV-WQ 1505.05.
     - (E) A SWPPP AMENDMENT SHALL BE SUBMITTED TO THE DEPARTMENT, FOR APPROVAL, ADDRESSING COLD WEATHER STABILIZATION (ENV-WQ 1505.05) AND INCLUDING THE REQUIREMENTS OF NO LESS THAN 30 DAYS PRIOR TO THE COMMENCEMENT OF WORK SCHEDULED AFTER NOVEMBER 30".

GENERAL CONSTRUCTION PLANNING AND SELECTION OF STRATEGIES TO CONTROL EROSION AND SEDIMENT ON HIGHWAY CONSTRUCTION PROJECTS

3. PLAN ACTIVITIES TO ACCOUNT FOR SENSITIVE SITE CONDITIONS:
   - 3.1. CLEARLY FLAG AREAS TO BE PROTECTED IN THE FIELD AND PROVIDE CONSTRUCTION BARRIERS TO PREVENT TRAFFICKING OUTSIDE OF WORK AREAS.
   - 3.2. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS.
   - 3.3. PROTECT AND MAXIMIZE EXISTING NATIVE VEGETATION AND NATURAL FOREST BUFFERS BETWEEN CONSTRUCTION ACTIVITY AND SENSITIVE AREAS.
   - 3.4. WHEN WORK IS PERFORMED IN AND NEAR WATER COURSES, STREAM FLOW DIVERSION METHODS SHALL BE IMPLEMENTED PRIOR TO ANY EXCAVATION OR FILLING.
   - 3.5. WHEN WORK IS PERFORMED WITHIN 50 FEET OF SURFACE WATERS (WETLAND, OPEN WATER OR FLOWING WATER), PERIMETER CONTROL SHALL BE ENHANCED CONSISTENT WITH SECTION 2.1.2.1. OF THE 2012 NPDES CONSTRUCTION GENERAL PERMIT.

4. MINIMIZE THE AMOUNT OF EXPOSED SOIL:
   - 4.1. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS. MINIMIZE THE AREA OF EXPOSED SOIL AT ANY ONE TIME. PHASING SHALL BE USED TO REDUCE THE AMOUNT AND DURATION OF SOIL EXPOSED TO THE ELEMENTS AND VEHICLE TRACKING.
   - 4.2. UTILIZE TEMPORARY MULCHING OR PROVIDE ALTERNATE TEMPORARY STABILIZATION ON EXPOSED SOILS IN ACCORDANCE WITH TABLE 1.
   - 4.3. THE MAXIMUM AMOUNT OF DISTURBED EARTH SHALL NOT EXCEED A TOTAL OF 5 ACRES FROM MAY 1" THROUGH NOVEMBER 30". OR EXCEED ONE ACRE DURING WINTER MONTHS, UNLESS THE CONTRACTOR DEMONSTRATES TO THE DEPARTMENT THAT THE ADDITIONAL AREA OF DISTURBANCE IS NECESSARY TO MEET THE CONTRACTORS CRITICAL PATH METHOD SCHEDULE (CPM), AND THE CONTRACTOR HAS ADEQUATE RESOURCES AVAILABLE TO ENSURE THAT ENVIRONMENTAL COMMITMENTS WILL BE MET.

5. CONTROL STORMWATER FLOWING ONTO AND THROUGH THE PROJECT:
   - 5.1. DIVERT OFF SITE RUNOFF OR CLEAN WATER AWAY FROM THE CONSTRUCTION ACTIVITY TO REDUCE THE VOLUME THAT NEEDS TO BE TREATED ON SITE.
   - 5.2. DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM DISTURBED AREAS, SLOPES, AND AROUND ACTIVE WORK AREAS AND TO A STABILIZED OUTLET LOCATION.
   - 5.3. CONSTRUCT IMPERMEABLE BARRIERS AS NECESSARY TO COLLECT OR DIVERT CONCENTRATED FLOWS FROM WORK OR DISTURBED AREAS.
   - 5.4. STABILIZE, TO APPROPRIATE ANTICIPATED VELOCITIES, CONVEYANCE CHANNELS OR PUMPING SYSTEMS NEEDED TO CONVEY CONSTRUCTION STORMWATER TO BASINS AND DISCHARGE LOCATIONS PRIOR TO USE.
   - 5.5. DIVERT OFF-SITE WATER THROUGH THE PROJECT IN AN APPROPRIATE MANNER SO NOT TO DISTURB THE UPSTREAM OR DOWNSTREAM SOILS, VEGETATION OR HYDROLOGY BEYOND THE PERMITTED AREA.

6. PROTECT SLOPES:
   - 6.1. INTERCEPT AND DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM UNPROTECTED AND NEWLY ESTABLISHED AREAS AND SLOPES TO A STABILIZED OUTLET OR CONVEYANCE.
   - 6.2. CONSIDER HOW GROUNDWATER SEEPAGE ON CUT SLOPES MAY IMPACT SLOPE STABILITY AND INCORPORATE APPROPRIATE MEASURES TO MINIMIZE EROSION.
   - 6.3. CONVEY STORMWATER DOWN THE SLOPE IN A STABILIZED CHANNEL OR SLOPE DRAIN.
   - 6.4. THE OUTER FACE OF THE FILL SLOPE SHOULD BE IN A LOOSE RUFFLED CONDITION PRIOR TO TURF ESTABLISHMENT. TOPSOIL OR HUMUS LAYERS SHALL BE TRACKED UP AND DOWN THE SLOPE, DISKED, HARROWED, DRAGGED WITH A CHAIN OR MAT, MACHINE-RAKED, OR HAND-WORKED TO PRODUCE A RUFFLED SURFACE.

7. ESTABLISH STABILIZED CONSTRUCTION EXITS:
   - 7.1. INSTALL AND MAINTAIN CONSTRUCTION EXITS, ANYWHERE TRAFFIC LEAVES A CONSTRUCTION SITE ONTO A PUBLIC RIGHT-OF-WAY.
   - 7.2. SWEEP ALL CONSTRUCTION RELATED DEBRIS AND SOIL FROM THE ADJACENT PAVED ROADWAYS AS NECESSARY.

8. PROTECT STORM DRAIN INLETS:
   - 8.1. DIVERT SEDIMENT LADEN WATER AWAY FROM INLET STRUCTURES TO THE EXTENT POSSIBLE.
   - 8.2. INSTALL SEDIMENT BARRIERS AND SEDIMENT TRAPS AT INLETS TO PREVENT SEDIMENT FROM ENTERING THE DRAINAGE SYSTEM.
   - 8.3. CLEAN CATCH BASINS, DRAINAGE PIPES, AND CULVERTS IF SIGNIFICANT SEDIMENT IS DEPOSITED.
   - 8.4. DROP INLET SEDIMENT BARRIERS SHOULD NEVER BE USED AS THE PRIMARY MEANS OF SEDIMENT CONTROL AND SHOULD ONLY BE USED TO PROVIDE AN ADDITIONAL LEVEL OF PROTECTION TO STRUCTURES AND DOWN-GRADIENT SENSITIVE RECEPTORS.

9. SOIL STABILIZATION:
   - 9.1. WITHIN THREE DAYS OF THE LAST ACTIVITY IN AN AREA, ALL EXPOSED SOIL AREAS, WHERE CONSTRUCTION ACTIVITIES ARE COMPLETE, SHALL BE STABILIZED.
   - 9.2. IN ALL AREAS, TEMPORARY SOIL STABILIZATION MEASURES SHALL BE APPLIED IN ACCORDANCE WITH THE STABILIZATION REQUIREMENTS (SECTION 2.2) OF THE 2012 CGP. (SEE TABLE 1 FOR GUIDANCE ON THE SELECTION OF TEMPORARY SOIL STABILIZATION MEASURES.)
   - 9.3. EROSION CONTROL SEED MIX SHALL BE SOWN IN ALL INACTIVE CONSTRUCTION AREAS THAT WILL NOT BE PERMANENTLY SEEDED WITHIN TWO WEEKS OF DISTURBANCE AND PRIOR TO SEPTEMBER 15, OF ANY GIVEN YEAR, IN ORDER TO ACHIEVE VEGETATIVE STABILIZATION PRIOR TO THE END OF THE GROWING SEASON.
   - 9.4. SOIL TACKIFIERS MAY BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND REAPPLIED AS NECESSARY TO MINIMIZE SOIL AND MULCH LOSS UNTIL PERMANENT VEGETATION IS ESTABLISHED.

10. RETAIN SEDIMENT ON-SITE AND CONTROL DEWATERING PRACTICES:
    - 10.1. TEMPORARY SEDIMENT BASINS (CGP-SECTION 2.1.3.2) OR SEDIMENT TRAPS (ENV-WQ 1506.10) SHALL BE SIZED TO RETAIN, ON SITE, THE VOLUME OF A 2-YEAR 24-HOUR STORM EVENT FOR ANY AREA OF DISTURBANCE OR 3,600 CUBIC FEET OF STORMWATER RUNOFF PER ACRE OF DISTURBANCE, WHICHEVER IS GREATER. TEMPORARY SEDIMENT BASINS USED TO TREAT STORMWATER RUNOFF FROM AREAS GREATER THAN 5-ACRES OF DISTURBANCE SHALL BE SIZED TO ALSO CONTROL STORMWATER RUNOFF FROM A 10-YEAR 24 HOUR STORM EVENT. ON-SITE RETENTION OF THE 10-YEAR 24-HOUR EVENT IS NOT REQUIRED.
    - 10.2. CONSTRUCT AND STABILIZE DEWATERING INFILTRATION BASINS PRIOR TO ANY EXCAVATION THAT MAY REQUIRE DEWATERING.
    - 10.3. TEMPORARY SEDIMENT BASINS OR TRAPS SHALL BE PLACED AND STABILIZED AT LOCATIONS WHERE CONCENTRATED FLOW (CHANNELS AND PIPES) DISCHARGE TO THE SURROUNDING ENVIRONMENT FROM AREAS OF UNSTABILIZED EARTH DISTURBING ACTIVITIES.

11. ADDITIONAL EROSION AND SEDIMENT CONTROL GENERAL PRACTICES:
    - 11.1. USE TEMPORARY MULCHING, PERMANENT MULCHING, TEMPORARY VEGETATIVE COVER, AND PERMANENT VEGETATIVE COVER TO REDUCE THE NEED FOR DUST CONTROL. USE MECHANICAL SWEEPERS ON PAVED SURFACES WHERE NECESSARY TO PREVENT DUST BUILDUP. APPLY WATER, OR OTHER DUST INHIBITING AGENTS OR TACKIFIERS, AS APPROVED BY THE NHDES.
    - 11.2. ALL STOCKPILES SHALL BE CONTAINED WITH TEMPORARY PERIMETER CONTROLS. INACTIVE SOIL STOCKPILES SHOULD BE PROTECTED WITH SOIL STABILIZATION MEASURES (TEMPORARY EROSION CONTROL SEED MIX AND MULCH, SOIL BINDER) OR COVERED WITH ANCHORED TARPS.
    - 11.3. EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSPECTED IN ACCORDANCE WITH SECTION 645 OF NHDOT SPECIFICATIONS, WEEKLY AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.25 IN. OF RAIN PER 24-HOUR PERIOD. EROSION AND SEDIMENT CONTROL MEASURES WILL ALSO BE INSPECTED IN ACCORDANCE WITH THE GUIDANCE MEMO FROM THE NHDES CONTAINED WITHIN THE CONTRACT PROPOSAL AND THE EPA CONSTRUCTION GENERAL PERMIT.
    - 11.4. THE CONTRACTOR SHOULD UTILIZE STORM DRAIN INLET PROTECTION TO PREVENT SEDIMENT FROM ENTERING A STORM DRAINAGE SYSTEM PRIOR TO THE PERMANENT STABILIZATION OF THE CONTRIBUTING DISTURBED AREA.
    - 11.5. PERMANENT STABILIZATION MEASURES WILL BE CONSTRUCTED AND MAINTAINED IN LOCATIONS AS SHOWN ON THE CONSTRUCTION PLANS TO STABILIZE AREAS. VEGETATIVE STABILIZATION SHALL NOT BE CONSIDERED PERMANENTLY STABILIZED UNTIL VEGETATIVE GROWTH COVERS AT LEAST 85% OF THE DISTURBED AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR EROSION AND SEDIMENT CONTROL FOR ONE YEAR AFTER PROJECT COMPLETION.
    - 11.6. CATCH BASINS: CARE SHALL BE TAKEN TO ENSURE THAT SEDIMENTS DO NOT ENTER ANY EXISTING CATCH BASINS DURING CONSTRUCTION. THE CONTRACTOR SHALL PLACE TEMPORARY STONE INLET PROTECTION OVER INLETS IN AREAS OF SOIL DISTURBANCE THAT ARE SUBJECT TO SEDIMENT CONTAMINATION.
    - 11.7. TEMPORARY AND PERMANENT DITCHES SHALL BE CONSTRUCTED, STABILIZED AND MAINTAINED IN A MANNER THAT WILL MINIMIZE SCOUR. TEMPORARY AND PERMANENT DITCHES SHALL BE DIRECTED TO DRAIN TO SEDIMENT BASINS OR STORM WATER COLLECTION AREAS.
    - 11.8. WINTER EXCAVATION AND EARTHWORK ACTIVITIES NEED TO BE LIMITED IN EXTENT AND DURATION, TO MINIMIZE POTENTIAL EROSION AND SEDIMENTATION IMPACTS. THE AREA OF EXPOSED SOIL SHALL BE LIMITED TO ONE ACRE, OR THAT WHICH CAN BE STABILIZED AT THE END OF EACH DAY UNLESS A WINTER CONSTRUCTION PLAN, DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST, IS REVIEWED AND APPROVED BY THE DEPARTMENT.
    - 11.9. CHANNEL PROTECTION MEASURES SHALL BE SUPPLEMENTED WITH PERIMETER CONTROL MEASURES WHEN THE DITCH LINES OCCUR AT THE BOTTOM OF LONG FILL SLOPES. THE PERIMETER CONTROLS SHALL BE INSTALLED ON THE FILL SLOPE TO MINIMIZE THE POTENTIAL FOR FILL SLOPE SEDIMENT DEPOSITS IN THE DITCH LINE.

BEST MANAGEMENT PRACTICES (BMP) BASED ON AMOUNT OF OPEN CONSTRUCTION AREA

12. STRATEGIES SPECIFIC TO OPEN AREAS LESS THAN 5 ACRES:
    - 12.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500: ALTERATION OF TERRAIN FOR CONSTRUCTION AND USE ALL CONVENTIONAL BMP STRATEGIES.
    - 12.2. SLOPES STEEPER THAN 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING.
    - 12.3. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT ALONE.
    - 12.4. AREAS WHERE HAUL ROADS ARE CONSTRUCTED AND STORMWATER CANNOT BE TREATED THE DEPARTMENT WILL CONSIDER INFILTRATION.
    - 12.5. FOR HAUL ROADS ADJACENT TO SENSITIVE ENVIRONMENTAL AREAS OR STEEPER THAN 5%, THE DEPARTMENT WILL CONSIDER USING EROSION STONE, CRUSHED GRAVEL, OR CRUSHED STONE BASE TO HELP MINIMIZE EROSION ISSUES.
    - 12.6. ALL AREAS THAT CAN BE STABILIZED SHALL BE STABILIZED PRIOR TO OPENING UP NEW TERRITORY.
    - 12.7. DETENTION BASINS SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE A 2 YEAR STORM EVENT.

13. STRATEGIES SPECIFIC TO OPEN AREAS BETWEEN 5 AND 10 ACRES:
    - 13.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES WILL BE UTILIZED.
    - 13.2. DETENTION BASINS WILL BE CONSTRUCTED TO ACCOMMODATE THE 2-YEAR 24-HOUR STORM EVENT AND CONTROL A 10-YEAR 24-HOUR STORM EVENT.
    - 13.3. SLOPES STEEPER THAN A 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS. OTHER ALTERNATIVE MEASURES, SUCH AS BONDED FIBER MATRIXES (BFMS) OR FLEXIBLE GROWTH MEDIUMS (FGMS) MAY BE UTILIZED, IF MEETING THE NHDES APPROVALS AND REGULATIONS.
    - 13.4. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS.

14. STRATEGIES SPECIFIC TO OPEN AREAS OVER 10 ACRES:
    - 14.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES AND BETWEEN 5 AND 10 ACRES WILL BE UTILIZED.
    - 14.2. THE DEPARTMENT ANTICIPATES THAT SOIL BINDERS WILL BE NEEDED ON ALL SLOPES STEEPER THAN 3:1, IN ORDER TO MINIMIZE EROSION AND REDUCE THE AMOUNT OF SEDIMENT IN THE STORMWATER TREATMENT BASINS.
    - 14.3. THE CONTRACTOR WILL BE REQUIRED TO HAVE AN APPROVED DESIGN IN ACCORDANCE WITH ENV-WQ 1506.12 FOR AN ACTIVE FLOCCULANT TREATMENT SYSTEM TO TREAT AND RELEASE WATER CAPTURED IN STORM WATER BASINS. THE CONTRACTOR SHALL ALSO RETAIN THE SERVICES OF AN ENVIRONMENTAL CONSULTANT WHO HAS DEMONSTRATED EXPERIENCE IN THE DESIGN OF FLOCCULANT TREATMENT SYSTEMS. THE CONSULTANT WILL ALSO BE RESPONSIBLE FOR THE IMPLEMENTATION AND MONITORING OF THE SYSTEM.

TABLE 1

GUIDANCE ON SELECTING TEMPORARY SOIL STABILIZATION MEASURES

APPLICATION AREAS	DRY MULCH METHODS				HYDRAULICALLY APPLIED MULCHES[2]				ROLLED EROSION CONTROL BLANKETS[3]			
	HMT	WC	SG	CB	HM	SMM	BFM	FRM	SNSB	DNSB	DNSCB	DNCB
SLOPES[1]												
STEEPER THAN 2:1	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	YES
2:1 SLOPE	YES*	YES*	YES	YES	NO	NO	YES	YES	NO	YES	YES	YES
3:1 SLOPE	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	NO
4:1 SLOPE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	NO
WINTER STABILIZATION	4T/AC	YES	YES	YES	NO	NO	YES	YES	YES	YES	YES	YES
CHANNELS												
LOW FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES
HIGH FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES

ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE
HMT	HAY MULCH & TACK	HM	HYDRAULIC MULCH	SNSB	SINGLE NET STRAW BLANKET
WC	WOOD CHIPS	SMM	STABILIZED MULCH MATRIX	DNSB	DOUBLE NET STRAW BLANKET
SG	STUMP GRINDINGS	BFM	BONDED FIBER MATRIX	DNSCB	2 NET STRAW-COCONUT BLANKET
CB	COMPOST BLANKET	FRM	FIBER REINFORCED MEDIUM	DNCB	2 NET COCONUT BLANKET

NOTES:
1. ALL SLOPE STABILIZATION OPTIONS ASSUME A SLOPE LENGTH ≤10 TIMES THE HORIZONTAL DISTANCE COMPONENT OF THE SLOPE, IN FEET.
2. PRODUCTS CONTAINING POLYACRYLAMIDE (PAM) SHALL NOT BE APPLIED DIRECTLY TO OR WITHIN 100 FEET OF ANY SURFACE WATER WITHOUT PRIOR WRITTEN APPROVAL FROM THE NH DEPARTMENT OF ENVIRONMENTAL SERVICES.
3. ALL EROSION CONTROL BLANKETS SHALL BE MADE WITH WILDLIFE FRIENDLY BIODEGRADABLE NETTING.

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION ∘ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL STRATEGIES

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
12-21-2015	26162 erosstrat	26162	8	11

EROSION CONTROL PLAN LEGEND

PERIMETER CONTROL
SILT FENCE
EROSION CONTROL MIX BERM
EROSION CONTROL MIX SOX
TURBIDITY CURTAIN
SHEET PILE
COFFER DAM

NATURAL BUFFER/PERIMETER CONTROL
SILT FENCE
EROSION CONTROL MIX BERM
EROSION CONTROL MIX SOX
TURBIDITY CURTAIN
SHEET PILE
COFFER DAM

CHANNEL PROTECTION
STONE CHECK DAMS
STRAW WATTLES
CHANNEL MATTING
CLASS D EROSION STONE
CLASS C STONE

CLEAN WATER BYPASS
PUMP THROUGH PIPE
DRAIN THROUGH PIPE OR CHANNEL

GRID

EXIST. R.R.R.O.W.

STATE PARK

STATE OF NH (DRED)

ALL DEBRIS FROM PIPE CLEANING SHALL BE CONTAINED WITHIN THE CONCRETE ENERGY DISSIPATOR.

REPAIR EXISTING STONE RETAINING WALL

STAGING AREA FOR PLACEMENT OF LIFTING EQUIPMENT

CLEAN WATER BYPASS VIA PUMPING, IF USED, SHALL DISCHARGE INTO THE ENERGY DISSIPATOR.

Saco River

timber plank roof (removable)

concrete energy dissipator

mrm ret. wall

gravel

ledge

103" x 71" cmp arch

12" cmp und.

10% slope change

3.9%

15" cmp und.

15" spp

15" rcp

sip gran curb

asphalt sluice

US ROUTE 302

EXIST. R.O.W.

8" cmp und.

30" rcp

gravel parking

CLEARING LINE

MATCH TO SHEET ER02

APPROXIMATE LIMIT OF ROCK SCALING STA 65+50 RT

PROPOSED STAGING AREA FOR ROCK SCALING WITHIN EXISTING GRAVEL PARKING AREA (EXTENDING BACK TO STA 62+00± RT) NO GROUND DISTURBANCE ANTICIPATED

CONSTRUCTION SEQUENCE - ROCK SCALING

ROCK SCALING INCLUDES CLEARING OF VEGETATION ON THE ROCK SLOPE AND TO 10' BACK FROM THE TOP OF SLOPE BY HAND METHODS.
ROCK SCALING INVOLVES REMOVAL OF LOOSE ROCK BY HAND METHODS.
A CONTINGENCY AMOUNT OF ROCK BOLTS WILL BE INCLUDED IN THE CONTRACT FOR STABILIZATION OF LARGE BLOCKS OF ROCK. ROCK BOLTS WILL BE INSTALLED USING A PORTABLE DRILL AND HAND METHODS.
CLEANUP INCLUDES REMOVAL OF FALLEN ROCK AND ROADWAY SWEEPING.

CONSTRUCTION SEQUENCE - CULVERT REHABILITATION

Install perimeter controls.
Install water diversion at inlet.
Clean water bypass shall be via pump(s), with discharge line(s) placed on the ground along the edge of pavement or a temporary pipe placed inside the culvert. In the case of a significant rain event, water shall be allowed to flow through the existing culvert.
Clean existing pipes and remove debris.
Inspect existing pipe, repair holes or bent plates.
Install metal plate liner in lower two pipe segments.
Grout annular space between plate liner and existing pipe.
Construct spray on mortar liner in upper segment.
Perform concrete repairs inside inlet.
Restore flow into culvert.
Reapir stone retaining wall at outlet.
Remove perimeter controls.

Contour Interval = 1 Foot

20 0 20 40
SCALE IN FEET

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	STATION	STATION	DATE

SDR PROCESSED DATE
NEW DESIGN DRH DATE 2016
SHEET CHECKED CAC DATE 4/2017
AS BUILT DETAILS DATE

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
26162ER01	26162	9	11

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	STATION	STATION	DATE

SDR PROCESSED		DATE
NEW DESIGN	DRH	DATE 2016
SHEET CHECKED	CAC	DATE 4/2017
AS BUILT DETAILS		DATE

STATE OF NH (DRED)

STATE PARK

STATE OF NH (DOT)

EXIST. R.R.R.O.W.

ALIGNMENT FOR CLEAN WATER PUMP DISCHARGE HOSE(S) IF USED OR PLACE CLEAN WATER BYPASS PIPE INSIDE EXISTING CULVERT

GRID

COUNTY LINE (APPROX. LOC.) CARROLL CO. COOS CO.

MATCH TO SHEET ER01

MATCH TO SHEET ER03

12" cmp und.

asphalt sluice

6"-30" bend

3.9% slope

103"x 71" cmp arch

2" bend

concrete transition

137"x 87" cmp arch 0.4% slope

US ROUTE 302

71 72 73 74 75

EXIST. R.R.R.O.W.

EXIST. R.O.W.

15" spp

15" rcp

stone/ asphalt hdr

sta gran curb

CLEARING LINE

TOWN LINE (APPROX. LOC.) HARTS LOCATION CARROLL

APPROXIMATE LIMIT OF ROCK SCALING STA 75+25 RT

Trail

Elephant Head (Rock Facial Shape)

NO GROUND DISTURBANCE ON THIS SHEET

NO WETLAND IMPACT ON THIS SHEET

Contour Interval = 1 Foot

STATE OF NH (DRED)

STATE PARK

20 0 20 40

SCALE IN FEET

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DCN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
26162ER02	26162	10	11

MATCH TO SHEET ERO2

STATE OF NH (DOT)

U.S.A. (WHITE MOUNTAIN NATIONAL FOREST)

CONSTRUCT WATER DIVERSION WITHIN LIMITS OF CONCRETE PAD AT INLET

B

stone ballast

Railroad Bridge

stone ballast

137" x 87" arch

Concrete inlet

Concrete pad

Concrete ret wall

STAGING AREA FOR PLACEMENT OF LIFTING EQUIPMENT

asphalt / gravel parking

STOCKPILE, STAGING AREA, AND FIELD OFFICE (WITHIN EXISTING PARKING AREA)

asphalt / gravel parking

EXIST. R.O.W.

EXIST. R.O.W. P-3190

U.S.A. (WHITE MOUNTAIN NATIONAL FOREST)

Trail

STAGING AREA FOR CLEAN WATER BYPASS PUMP(S) IF USED OR PLACE CLEAN WATER BYPASS PIPE INSIDE EXISTING CULVERT

US ROUTE 302

U.S.A. (WHITE MOUNTAIN NATIONAL FOREST)

EXIST. R.O.W.

EXIST. R.O.W. P-

GRID

SCALE IN FEET

20 0 20 40

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	STATION	STATION	DATE

		DATE
SDR PROCESSED		
NEW DESIGN	DRH	DATE 2016
SHEET CHECKED	CAC	DATE 4/2017
AS BUILT DETAILS		DATE

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
26162ER03	26162	11	11